COMPAQ

ProLiant 8000 Intel Pentium III Xeon 700MHz Servers

Maintenance and Service Guide

First Edition (April 2000)
Part Number 187242-001
Spare Part Number 192848-001
Compaq Computer Corporation

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About This Guide

This maintenance and service guide can be used for reference when servicing *Compaq ProLiant*™ 8000 servers.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create conditions that are hazardous.

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

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Compaq Technician Notes

Weight in kg
Weight in lb

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Any indications of component replacement or printed wiring board modifications may void any warranty.

WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repair specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs could create conditions that are hazardous.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature. The computer is designed to be electrically grounded. Plug the AC power cord into a properly grounded AC outlet only.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: To properly ventilate your system, you must provide at least 12 inches (30.5 cm) of clearance at the front and back of the computer.

CAUTION: The computer is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User Documentation
- *Compaq Service Quick Reference Guide*
- Service Training Guides
- Compaq Service Advisories and Bulletins
- Compaq QuickFind
- Compaq Insight Manager
- Compaq Download Facility: Call 1-281-518-1418

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Integrated Management Display

All Compaq ProLiant 8000 servers include a Compaq Integrated Management Display (IMD), which is an integrated, 16 x 4 character display mounted on the front of the server. This display provides easy-to-use, menu-driven access to server information, including model number, LCD firmware revision, and POST operations.

Telephone Numbers

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868

For Compaq technical support:

- In the United States and Canada, call 1-800-386-2172
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website at:

  http://www.compaq.com

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Chapter 1

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spare parts list for the ProLiant 8000 server. Table 1-1 contains mechanical part descriptions and spare part numbers. Table 1-2 contains system component descriptions and spare part numbers

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Mechanical Parts Exploded View

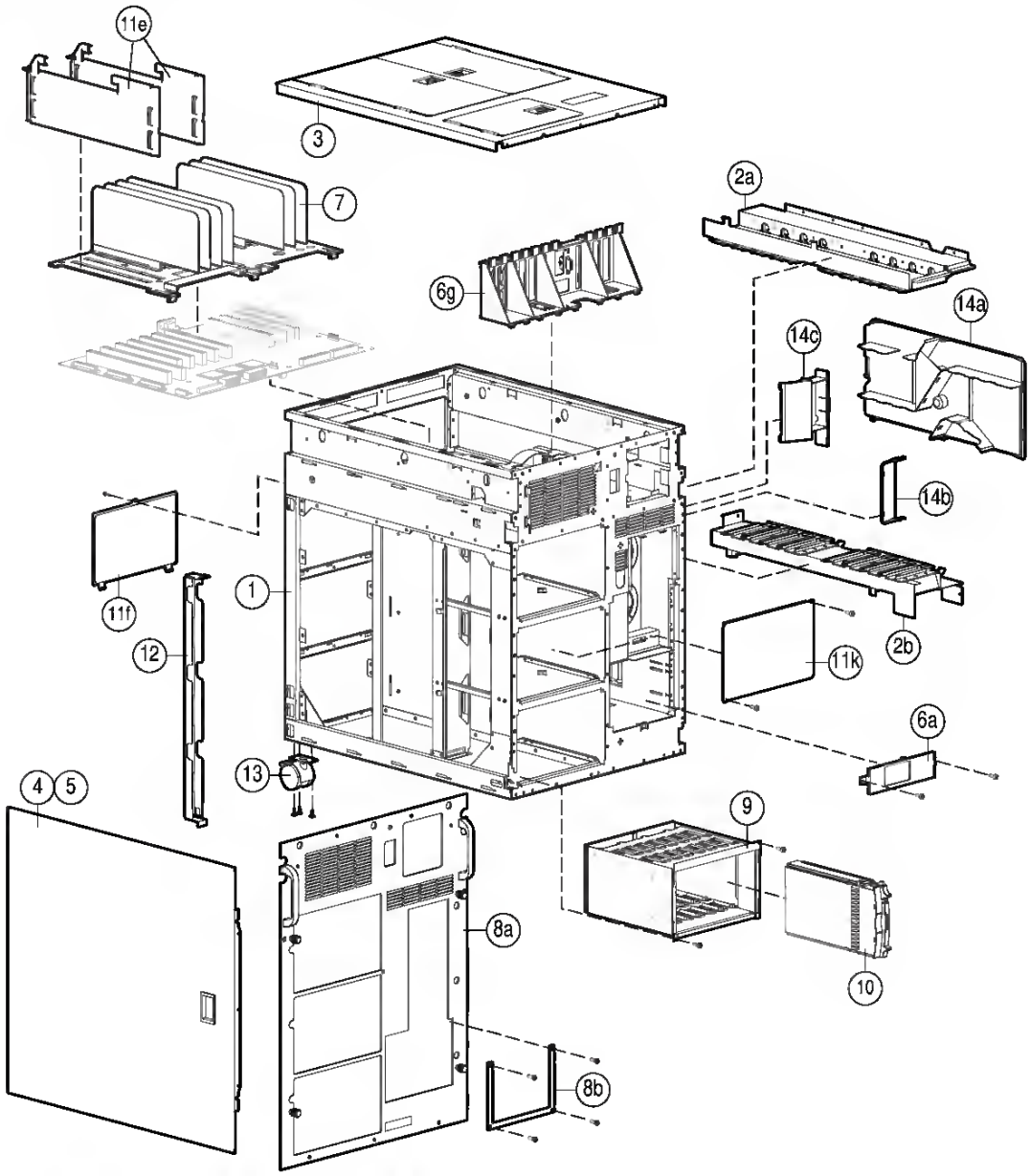

Figure 1-1. Mechanical parts exploded view

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Mechanical Spare Parts List

Table 1-1
Mechanical Spare Parts List

Item	Description	Spare Part Number
Chassis		
1	Chassis	126978-001
2	Upper and lower processor guides	126972-001
	a) Upper processor support structure	
	b) Lower processor support structure	
3	Top access panel with access key	126979-001
4	Right side access panel	126991-001
5	Left side access panel	126991-001
6	Miscellaneous plastics kit	126983-001
	a) Removable media blanking panel	
	b) Flat ribbon cable clips*	
	c) Slide fillers*	
	d) LED holder clip*	
	e) Expansion board locking lever*	
	f) Cable grommet*	
	g) Expansion board guide	
7	Hot-plug basket insulator	126980-001
Assemblies		
8	Front bezel kit	126992-001
	a) Front bezel, opal	
	b) Removable media trim, opal	
9	Ultra2 drive cage with backplane board	126994-001
Miscellaneous		
10	Hard drive blanking panel	122759-001

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Table 1-1
Mechanical Spare Parts List *continued*

Item	Description	Spare Part Number
11	Miscellaneous hardware kit	126984-001
	a) Memory board retention bracket*	
	b) Expansion board blanking panel*	
	c) External SCSI slot blanking panel*	
	d) Redundant fan slot cover*	
	e) Extended SCSI dividers	
	f) Power supply blanking panel	
	g) Removable media blanking panel EMI shield*	
	h) Processor cage support brace*	
	i) Processor board support retainer*	
	j) Processor board support*	
	k) Hot-plug drive cage blanking panel	
12	Power supply lock bar with lock kit	296201-001
13	Casters	296227-001
14	Baffle kit	126993-001
	a) Processor and VRM air baffle	
	b) Front air baffle	
	c) Rear air baffle	

*Not shown

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System Components Exploded View

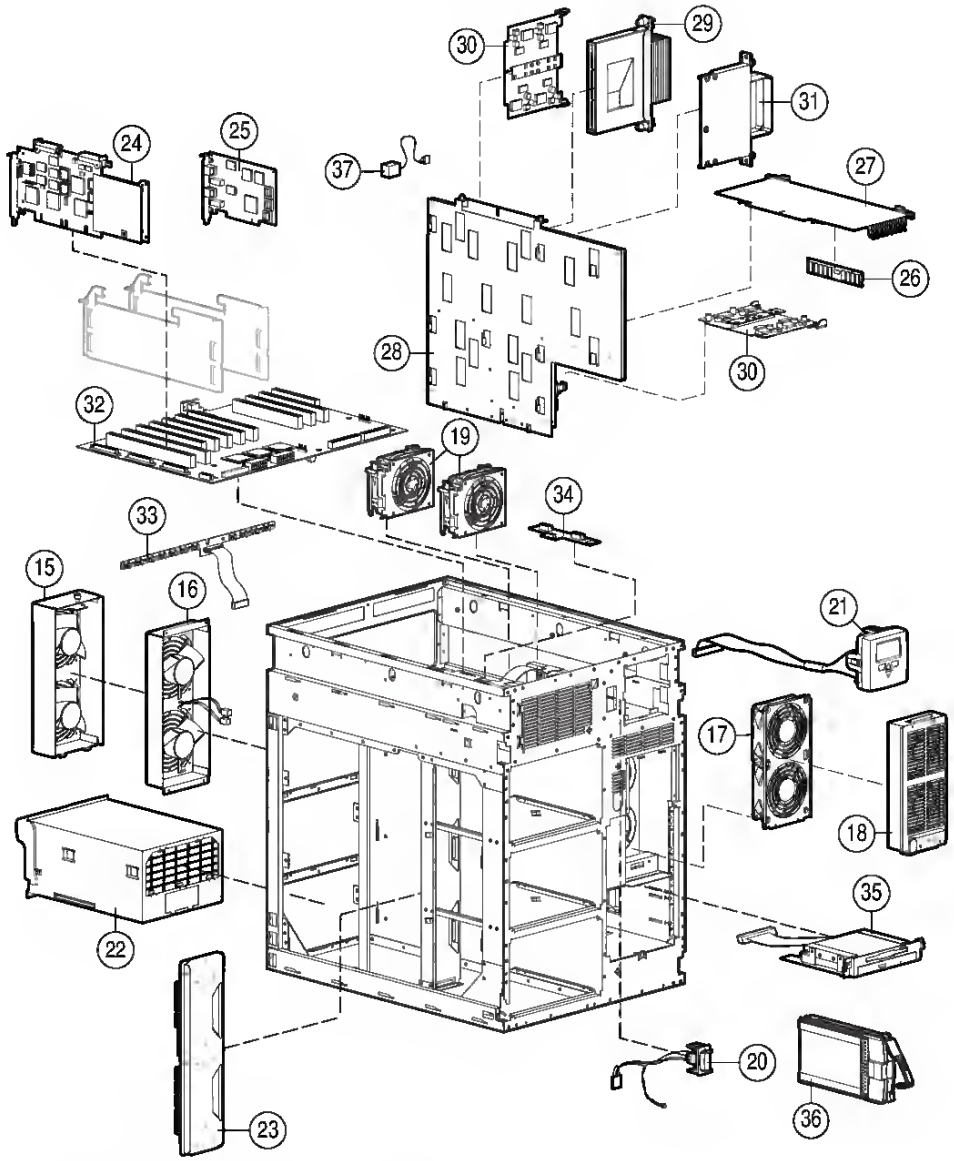

Figure 1-2. System components exploded view

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System Components Spare Parts List

Table 1-2
System Components Spare Parts List

Item	Description	Spare Part Number
Assemblies		
15	Hot-plug rear processor fans	126987-001
16	Redundant rear processor fans	126988-001
17	Redundant front processor fans	126990-001
18	Hot-plug front processor fans	126989-001
19	Hot-plug front I/O fan(s)	153312-001
20	Power On/Standby switch with cable and LED	126977-001
21	Integrated Management Display panel with cable	122223-001
System Components		
22	Hot-plug power supply, 1150W	122235-001
	Boards	
23	Power backplane board, 12-blade	126975-001
24	Smart Array 4250ES controller	401858-001
25	NC3131 10/100 TX UTP Network Interface Controller (NIC)	338478-001
26	Memory module, 128-MB, 64-Mb CL2 (Quantity 1)	146488-001
27	Memory board	122215-001
28	Processor board with tray	126973-001
29	Processor, 700 MHz with 1-MB cache and heatpipe	178943-001
30	Processor Power Module (VRM)	312257-001
31	Processor terminator board	312334-001
32	I/O system board	126982-001
33	PCI Hot Plug switch board with cable	126981-001
34	Hot Plug I/O fan board assembly	312344-001
	Mass Storage	
35	24X Max IDE slimline CD-ROM/1.44-MB diskette drive assembly	126974-001
36	4.3-GB 1-inch 7,200 rpm Ultra2 hard drive with tray	242622-001
	Miscellaneous	
37	4.5V battery replacement	160274-001

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Table 1-2
System Components Spare Parts List *continued*

Item	Description	Spare Part Number
38	Miscellaneous screw kit*	154954-001
	a) Screw, taptite, T-15, oval-head	
	b) Screw, 6-32x.312 inch, TF, HI/TP	
	c) Screw, shoulder, 6-32x.335 inch, Torx-15	
	d) Screw/washer	
39	Miscellaneous power cable kit*	126986-001
	a) 10-position, 6A, 6-inch power cable	
	b) 8-inch signal/power cable	
	c) Media bay 2 device power cable	
	d) External fan hot-plug power cable	
	e) Internal fan hot-plug power cable	
	f) 16-position, 9A, 17-inch power cable	
	g) 18-position, 9A, 19-inch power cable	
	h) PCI Hot Plug, 50P, 8-inch power cable	
	I) 22-position, 9A, 18-inch power cable	
40	Miscellaneous signal cable kit*	126985-001
	a) 68-position A, B, C SCSI cable	
	b) 68-position, 46-inch, signal cable	
	c) CD-ROM/diskette drive, 30-inch, data power/signal cable	
	d) Wide SCSI signal cable with terminator	
	e) Internal bypass and thermistor, 8-inch cable	
	f) Fan hot-plug upstairs, 13-inch cable	
41	Tower conversion kit*	126976-001
42	Rack mount kit*	161666-001
43	Country kit*	190418-001
44	Return kit*	306370-001
45	Carton and buns, international*	306370-002
46	Maintenance and service guide*	192848-001

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Table 1-2
System Components Spare Parts List *continued*

Item	Description	Spare Part Number
47	Illustrated parts map*	192847-001
	Options	
48	Keyboard*	160648-XXX
49	Ethernet loopback RJ-45*	317465-001
50	4.3-GB 1-inch 10,000 rpm Ultra2 hard drive with tray*	336380-001
51	9.1-GB 1-inch 7,200 rpm Ultra2 hard drive with tray*	104665-001
52	9.1-GB 1-inch 10,000 rpm Ultra2 hard drive with tray*	386536-001
53	18.2-GB 1-inch 7,200 rpm Ultra2 hard drive with tray*	104663-001
54	18.2-GB 1-inch 10,000 rpm Ultra2 hard drive with tray*	143920-001
55	9.1-GB 1-inch 10,000 rpm Ultra3 hard drive with tray	152188-001
56	18.2-GB 1-inch 10,000 rpm Ultra3 hard drive with tray	152190-001
57	Processor, 700 MHz with 2-MB cache and heatpipe*	178944-001
58	Cache Accelerator*	143887-001
59	Memory module, 256-MB, 128-Mb, CL3 (Quantity 1)*	146489-001
60	Memory module, 512-MB, 128-Mb, CL2 (Quantity 1)*	170515-001
61	Memory module, 256-MB, 64-Mb, CL2 (Quantity 1)*	170514-001
62	Memory module, 512-MB, 256-Mb, CL2 (Quantity 1)*	170515-001
63	Memory module, 512-MB, 128-Mb, CL3 (Quantity 1)*	170516-001
64	Memory module, 512-MB, 256-Mb, CL3 (Quantity 1)*	170517-001
65	Memory module, 1-GB, 256-Mb, CL2 (Quantity 1)*	170518-001
66	Memory module, 1-GB, 256-Mb, CL3 (Quantity 1)*	170519-001

*Not shown

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Chapter 2

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for Compaq ProLiant 8000 servers. After completing all necessary removal and replacement procedures, run the Diagnostics program to verify that all components operate properly.

To service Compaq ProLiant 8000 servers, you might need the following:

- Flatblade screwdriver
- Phillips screwdriver
- Torx T-15 screwdriver
- From the Compaq SmartStart and Support Software CD:
  - System Configuration Utility software
  - Drive Array Advanced Diagnostics software
  - Diagnostics software

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconductive materials, such as plastic assembly aids and foam packing.
- Make sure you are always properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives PCB assembly-side down.
- Use conductive field service tools.

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Symbols in Equipment

WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component.

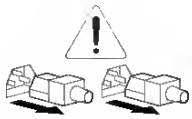
If this surface is contacted, the potential for injury exists. To reduce the risk of injury from a hot component, allow the surface to cool before touching it.

WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of electric shock hazards. The enclosed area contains no operator-serviceable parts. To reduce the risk of injury from electric shock, do not open this enclosure.

WARNING: Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely. To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

WARNING: Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection. To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

WARNING: This label or equivalent is located on the surface of your CD-ROM drive. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.



WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system. Power supplies marked with these symbols indicate the equipment is supplied by multiple sources of power.

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System Interlocks

Compaq ProLiant 8000 servers sbip with system interlocks. System interlocks consist of three LEDs providing a closed-loop checking mechanism for verifying proper cabling interconnects between critical server components. These LEDs are located on both the I/O and the processor boards. They provide a visual aid to assist in isolating components to check if the server will not power up because of a broken interlock chain. The I/O board is located directly beneath the PCI Hot Plug access doors under the top access panel. An amber system power LED on the front of the server will illuminate whenever the interlock chain is broken.

Preparation Procedures

Hot-Pluggable Parts

Before beginning the removal of any serviceable parts, determine whether the part is hot-pluggable or non-hot-pluggable. If it is hot-pluggable, do not perform a power shutdown of the server. The access panels can be removed while the server is powered up without causing a system shutdown. When the server is in Standby mode, portions of the power supply, auxiliary power (+5V), and some internal circuitry will remain active.

Non-Hot-Pluggable Parts

If any serviceable parts are non-hot-pluggable, then the server must be shut down. Non-hot-pluggable parts include the processor, Processor Power Module, system board, memory board, and DIMMs. Refer to "Turning Off the Server" later in this chapter for complete instructions.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system. Power supplies marked with these symbols indicate the equipment is supplied by multiple sources of power.

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Turning Off the Server

The ProLiant 8000 server's Power On/Standby switch does not shut off the system power completely. The switch functions as On and Standby, rather than On and Off. Standby mode removes power from most of the electronics and the drives, but portions of the power supply and some internal circuitry remain active.

IMPORTANT: To completely remove all power from the system, you must disconnect the power cord from the server. In systems with multiple power supplies, you must disconnect all power cords to completely remove power from the system.

IMPORTANT: It is not necessary to turn off the server to replace hot-plug devices, such as PCI Hot Plug power supplies or hot-plug fans.

NOTE: It is necessary to be knowledgeable of electrostatic discharge information before performing the preparation procedures. For electrostatic discharge information, see "Electrostatic Discharge Information" earlier in this chapter.

Before beginning any removal and replacement procedure for non-hot-plug devices:

1. Press the Power On/Standby switch to Standby mode. This disables the main power supply output and provides auxiliary power (+5V) to the server. Standby does not disable main AC power.
2. Verify that the system LED on the front panel, near the Power On/Standby switch, is off and that the fan noise abates.
3. Disconnect all power cords from the server.
4. For some removal and replacement procedures, you must remove the server from the rack and place it on a sturdy table or workbench. Refer to the *Compaq ProLiant 8000 Setup and Installation Guide* for instructions.

46 – 109 kg
100 – 240 lb

WARNING: To reduce the risk of personal injury or damage to the equipment:

- Observe local Occupational Safety requirements and guidelines for heavy equipment handling.
- Obtain adequate assistance to lift and stabilize the product during installation or removal.
- Remove all pluggable power supplies and modules to reduce the weight of the product.
- Stabilize the server by keeping the unit on the rails.

WARNING: Because the rack allows you to stack computer components on a vertical rather than horizontal plane, you must take precautions to provide for rack stability and safety. These precautions also protect both personnel and property. Follow all cautions and warnings throughout the installation instructions that came with the server.

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WARNING: To reduce the risk of electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electric outlet that is easily accessible at all times.

Rack Warnings

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizers are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- The rack is adequately stabilized before extending a component outside the rack.
- One component is extended at a time.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electric outlet that is easily accessible at all times.
- Install the power supply before connecting the power cord to the power supply.
- Unplug the power cord before removing the power supply from the server.
- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.

CAUTION: Compaq ProLiant 8000 servers must always be operated with the system unit cover on. Proper cooling will not be achieved if the system unit cover is removed.

Servers Warnings and Precautions

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

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Top Access Panel

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: When the server is powered up, the access panel must be installed for proper system cooling. Otherwise, component stress and permanent damage may result.

To remove the top access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Loosen the three top thumbscrews located on the front of the chassis. The center screw has no knurling and requires a T-15 screwdriver.
3. Using the top access panel handle, slide the top access panel back. Then lift it from the chassis.

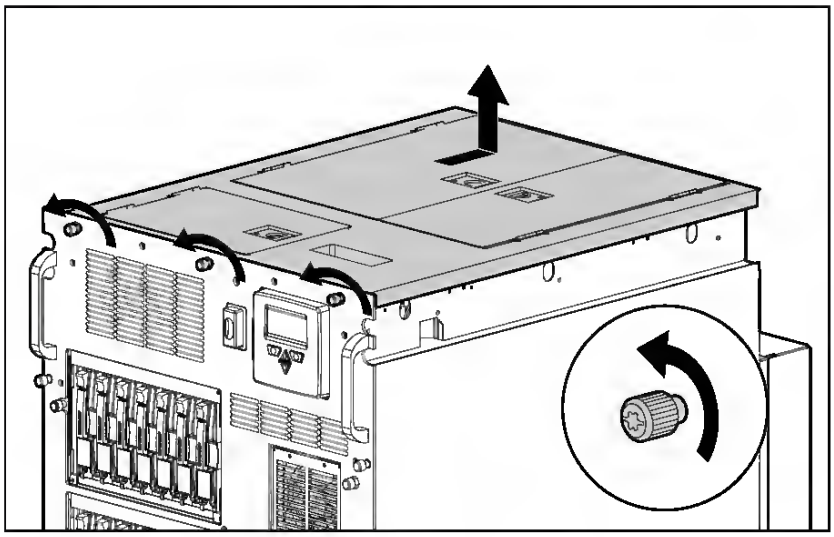

Figure 2-1. Removing the top access panel

Reverse steps 1 through 3 to replace the top access panel.

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Right Side Access Panel

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: When the server is powered on, the access panels must be installed for proper system cooling. Otherwise, component stress and permanent damage may result.

To remove the right side access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Loosen the three side access panel screws on the front of the server. The center screw has no knurling and requires a T-15 screwdriver.
3. Slide the right side access panel back, then pull it away from the chassis.

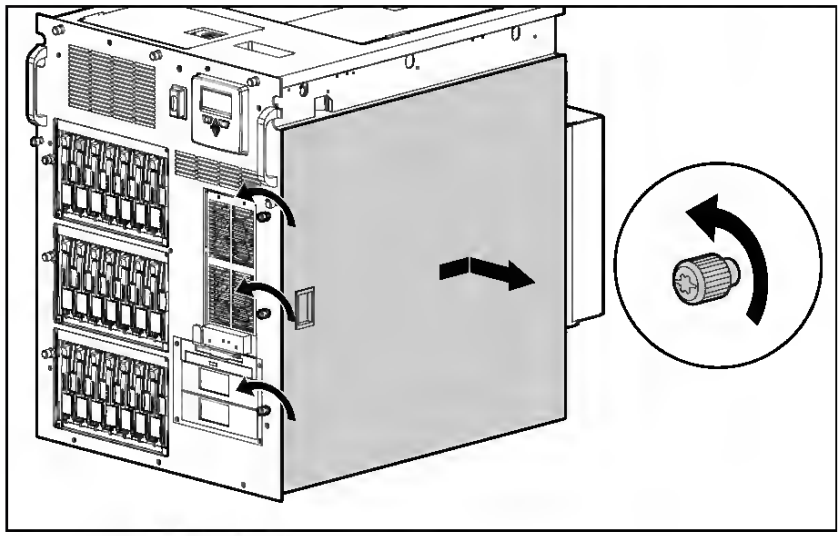

Figure 2-2. Removing the right side access panel

Reverse steps 1 through 3 to replace the right side access panel.

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Left Side Access Panel

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: When the server is powered on, the access panels must be installed for proper system cooling. Otherwise, component stress and permanent damage may result.

To remove the left side access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Loosen the three side access panel screws on the front of the server. The center screw has no knurling and requires a T-15 screwdriver.
3. Slide the left side access panel back, then pull it away from the chassis.

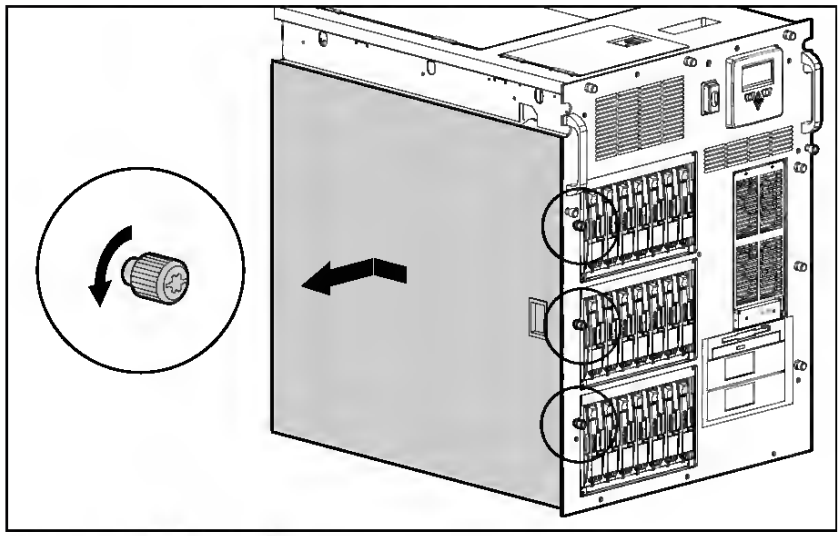

Figure 2-3. Removing the left side access panel

Reverse steps 1 through 3 to replace the left side access panel.

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Casters

To remove the casters:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Place the server on its side.
3. Remove the three T-15 screws securing each caster to the bottom of the server.
4. Pull the casters away from the server.

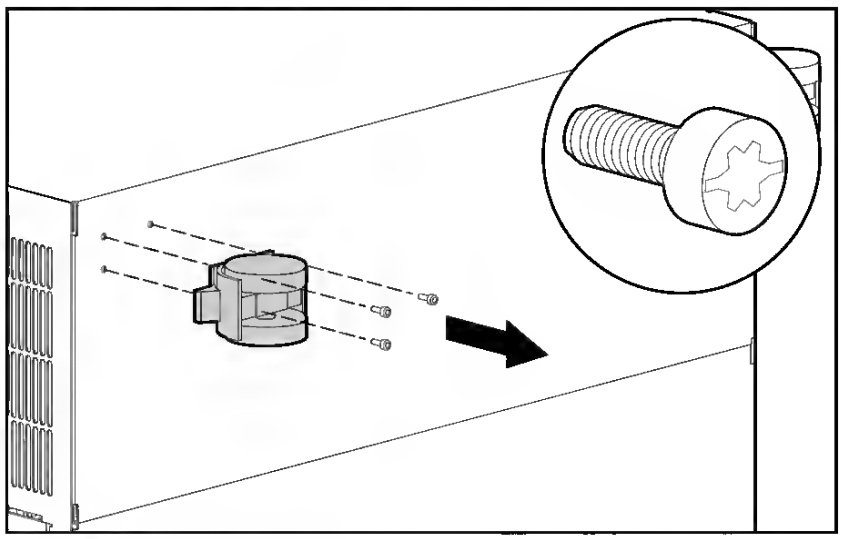

Figure 2-4. Removing the casters

Reverse steps 1 through 4 to replace the casters.

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Front Air Baffle

To remove the front air baffle:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the rigbt side access panel. See "Right Side Access Panel" earlier in tbis chapter.
3. Press in on the locking tabs at each end of the front air baffle ❶.
4. Pull the front air baffle out of the front fan assembly area ❷.

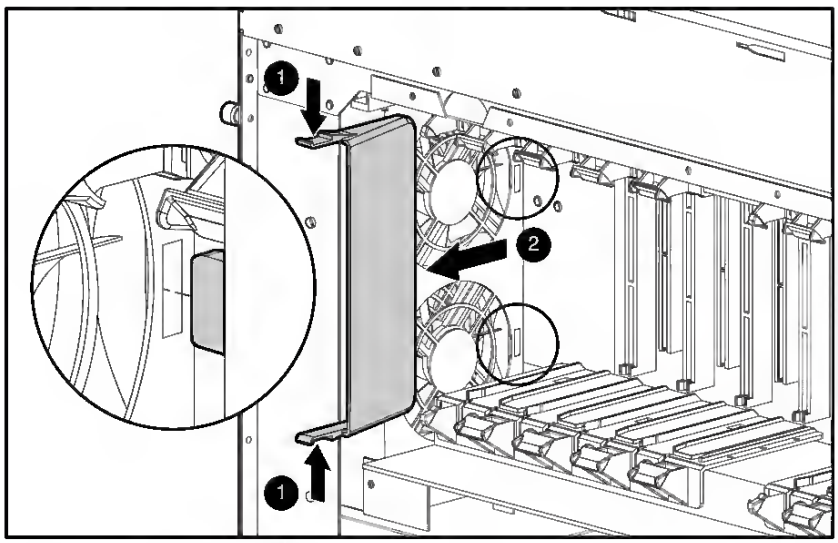

Figure 2-5. Removing the front air baffle

Reverse steps 1 through 4 to replace the front air baffle.

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Rear Air Baffle

To remove the rear air baffle:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Press the release tab ❶, then pivot and remove the rear air baffle from the rear of the server ❷ (next to the rear fan assembly).

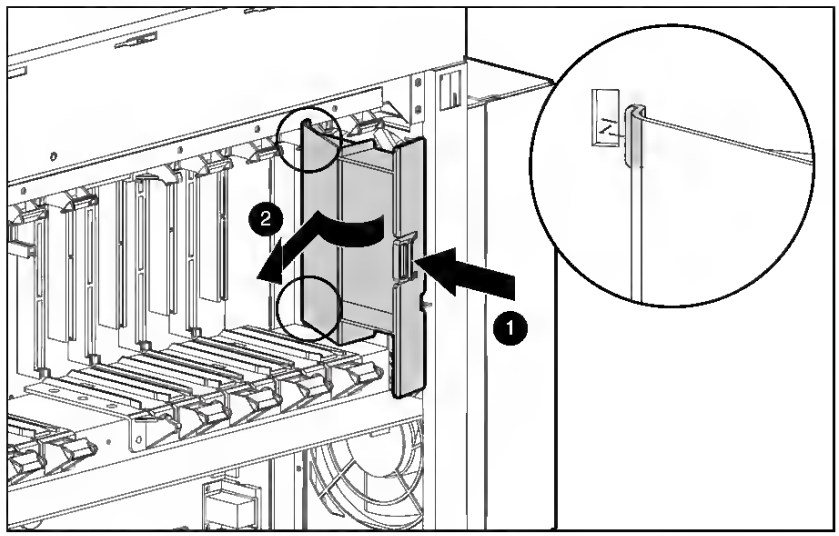

Figure 2-6. Removing the rear air baffle

Reverse steps 1 through 3 to replace the rear air baffle.

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Main Processor Air Baffle

To remove the main processor air baffle:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the rigbt side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Insert your thumb and index finger into the finger-grips ❶, then pivot the main processor air baffle out ❷ and away from the chassis.
4. Lift the main processor air baffle out from the side of the server.

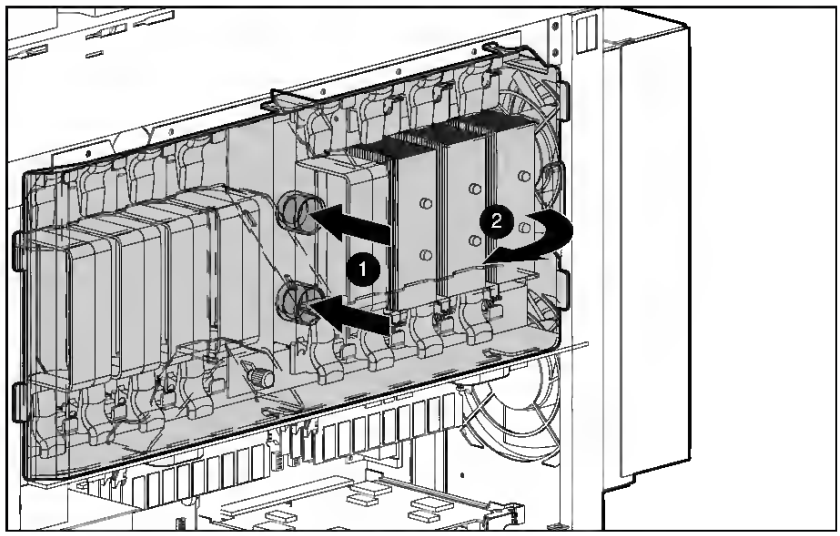

Figure 2-7. Removing the main processor air baffle

Reverse steps 1 through 4 to replace the main processor air baffle.

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Face Plates

NOTE: The front bezel and the removable media trim can be removed independently of each other.

Removable Media Trim

To remove the removable media trim:

1. Remove the four T-15 screws securing the removable media trim to the front of the chassis.
2. Pull the frame away from the chassis.

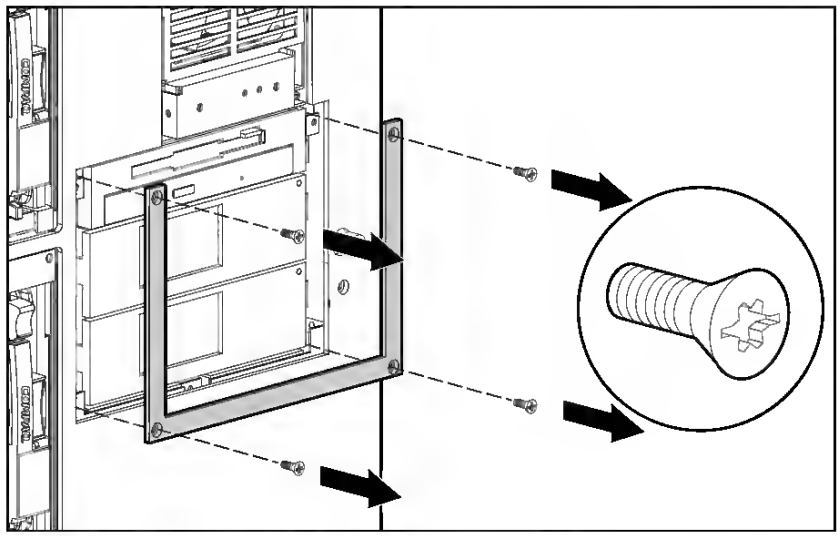

Figure 2-8. Removing the removable media trim

Reverse steps 1 and 2 to replace the removable media trim.

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Front Bezel

To remove the front bezel:

1. Remove the twelve T-15 screws securing the front bezel to the chassis.
2. Pull the front bezel away from the server.

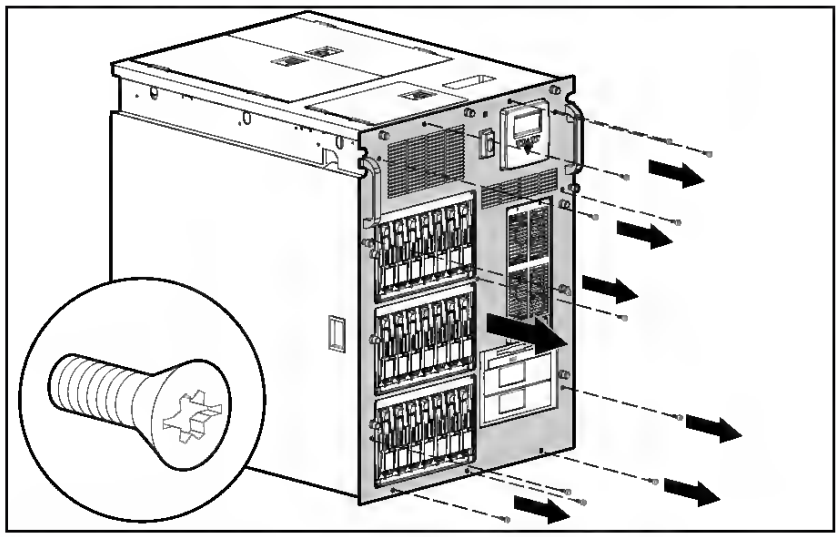

Figure 2-9. Removing the front bezel

Reverse steps 1 and 2 to replace the front bezel.

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Mass Storage and Removable Media Devices

Mass storage in Compaq ProLiant 8000 servers is divided between three hot-plug hard drive cages and a removable media area. Mass storage and removable media devices include the following:

- Up to seven 1-inch form factor Ultra2 hard drives (SCSI IDs 0 to 5, and 8) per drive cage
- One slim-line combination CD-ROM/1.44-MB diskette drive
- Two additional media bays

Figure 2-10 and Table 2-1 show the standard shipping configuration of the removable media area and possible configurations for the hot-plug and Ultra2 SCSI drive cages in Compaq ProLiant 8000 servers.

CAUTION: Removable media blank bezels and hot-plug drive cage blanking panels must be installed over unused mass storage and removable media device bays to maintain proper air flow.

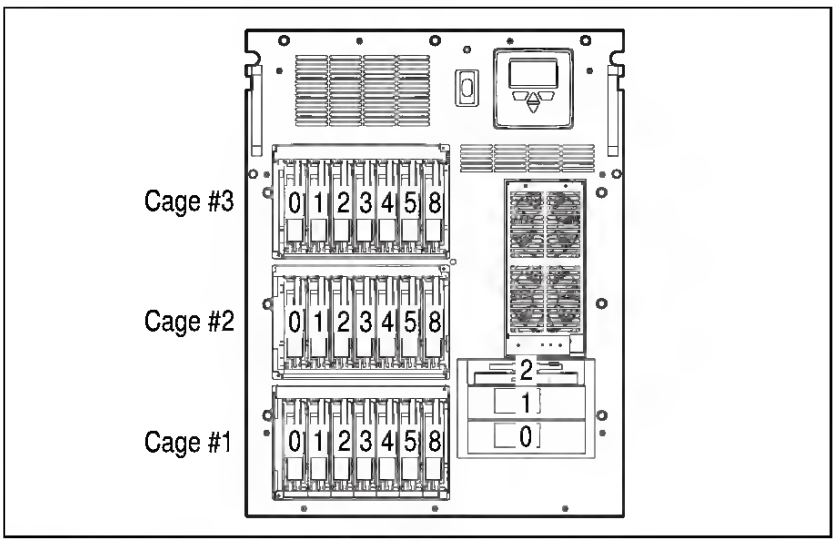

Figure 2-10. Mass storage and removable media areas

Table 2-1
Mass Storage and Removable Media Area Configurations

Location	Drive Positions (SCSI Identification)	Configuration
Hot-plug drive cage #3	0-5 and 8	Example of 1-inch hot-plug hard drives
Hot-plug drive cage #2	0-5 and 8	Example of 1-inch hot-plug hard drives
Hot-plug drive cage #1	0-5 and 8	Example of 1-inch hot-plug hard drives
Removable media bay	2	Non-hot-plug, integrated, 1.44 MB, 3.5-inch diskette drive
Removable media bay	2	Non-hot-plug 24X Max IDE slimline CD-ROM drive
Removable media bay	0-1	Non-hot-plug mass storage devices

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Removable Media Blanking Panel

To remove a removable media blanking panel from the removable media area:

1. Remove the removable media trim. See "Removable Media Trim" earlier in this chapter.
2. Remove the two T-15 screws securing the blank bezel to the chassis ❶.
3. Pull the blanking panel away from the front of the server ❷.

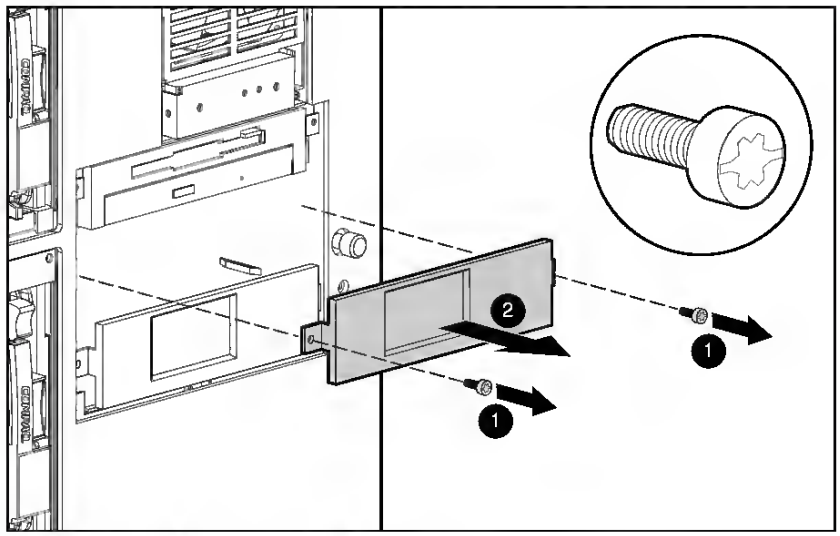

Figure 2-11. Removing a removable media blanking panel

Reverse steps 1 through 3 to replace the removable media blanking panel.

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Removable Media Devices

To remove a removable media device from the removable media area:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Disconnect the power and signal cables from the removable media device.
4. Remove the removable media trim. See "Removable Media Trim" earlier in this chapter.
5. Remove the two retaining screws securing the removable media device to the chassis ❶.
6. Pull the removable media device from the removable media bay ❷.

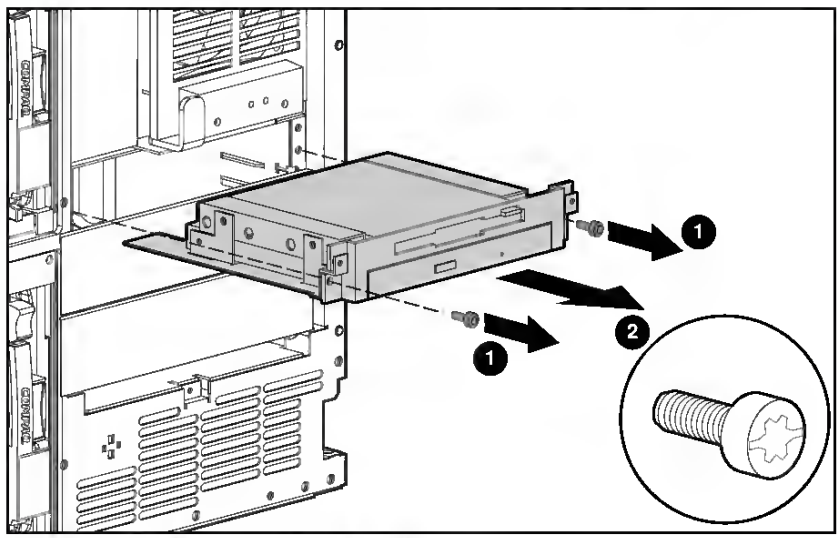

Figure 2-12. Removing a removable media device

Reverse steps 1 through 6 to replace a removable media device in the removable media area.

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Hard Drive Blanking Panels

To remove a hard drive blanking panel from a hard drive bay:

1. Press the lower release button ❶.
2. Pull the bard drive blanking panel away from the server ❷.

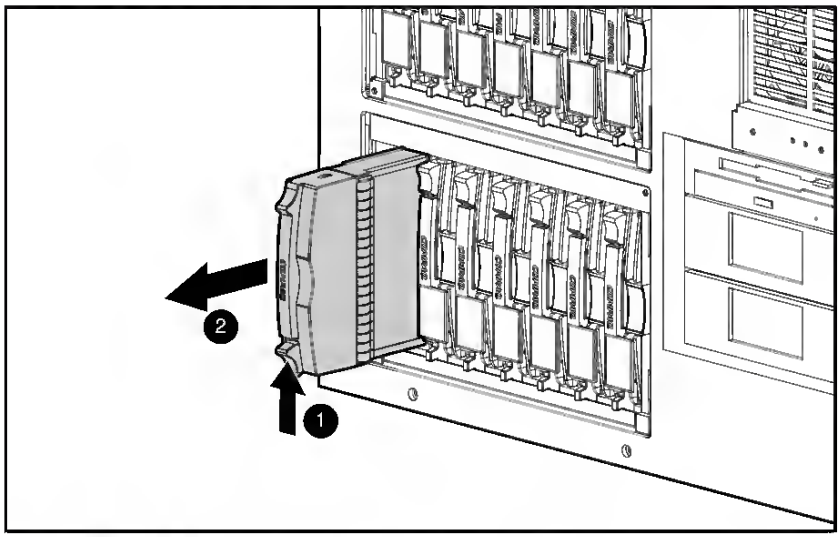

Figure 2-13. Removing a hard drive blanking panel from a hard drive bay

Reverse steps 1 and 2 to replace a hard drive blanking panel.

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Hot-Plug Drive Replacement Guidelines

You should be able to bot-plug a drive during normal activity. Be aware, however, that hot-plugging a disk drive will affect system performance and fault tolerance.

NOTE: Depending upon your configuration, a drive failure and the subsequent rebuild process will cause storage subsystem performance degradation. For example, the replacement of a single drive on an array with 50 logical drives will have less impact than if the array has three logical drives.

When a disk drive is hot-plugged, although the system is functionally operational, the disk subsystem may no longer be fault tolerant.

CAUTION: Fault tolerance will be lost until the removed drive is replaced and the rebuild operation is completed (this will take several hours, even if the system is not busy while the rebuild is in progress). If another drive in the array incurs an error during the period when fault tolerance is unavailable, a fatal system error could result.. If another drive fails during this period, the entire contents of the array will be lost.

IMPORTANT: Perform a disk drive replacement during low activity periods whenever possible. In addition, have a current valid backup available for the logical drives in the array of the drive being replaced, even if drive replacement is being made during server downtime.

Hot-Plug Drive Replacement Precautions

Be aware of the following Compaq guidelines for safe hot-plug replacement:

- Do not remove a degraded drive if any other member of the array is offline (the online LED is off). No other drive in the array can be hot-plugged without data loss, unless RAID 0+1 is used as a fault tolerant form. In this case, drives are mirrored in pairs. More than one drive can fail and be replaced as long as the drive or drives they are mirroring are online.

  Refer to your Smart Array Controller user guide for information on fault tolerance options.

- Do not remove a degraded drive if any member of an array is missing (previously removed and not yet replaced).

- Do not remove a degraded drive if any member of an array is being rebuilt, unless the drive being rebuilt has been configured as an online spare. The online LED for the drive being rebuilt will flash, indicating that a replaced drive is being rebuilt from data stored on the other drives.

  NOTE: An online spare will not activate and start rebuilding after a predictive failure alert because the degraded drive is still online. The online spare activates only after a drive in the array has failed.

- Do not replace multiple degraded drives at the same time (for example, when the system is off), or the fault tolerance may be compromised. When a drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one drive is removed, a complete data set is not available to reconstruct data on the replacement drive or drives, and permanent data loss could occur.

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CAUTION: Do not turn off an attached disk drive enclosure when the server containing the Smart Array Controller is powered on. Also, do not turn on the server before turning on the disk enclosure. If these ordering rules are not followed, the Smart Array Controller may mark the drives in this enclosure as "failed," which could result in permanent data loss.

NOTE: For more information on hard drive LED statuses, refer to Chapter 4.

To remove a hot-plug SCSI hard drive:

CAUTION: Replace a hot-plug SCSI hard drive only when the drive LED is amber. Do not remove a hot-plug SCSI hard drive if the online LED is green.

1. Press the release button for the SCSI hard drive ejector lever ❶.
2. Pull the locking release lever ❷ forward.
3. Pull the hard drive from the drive cage ❸.

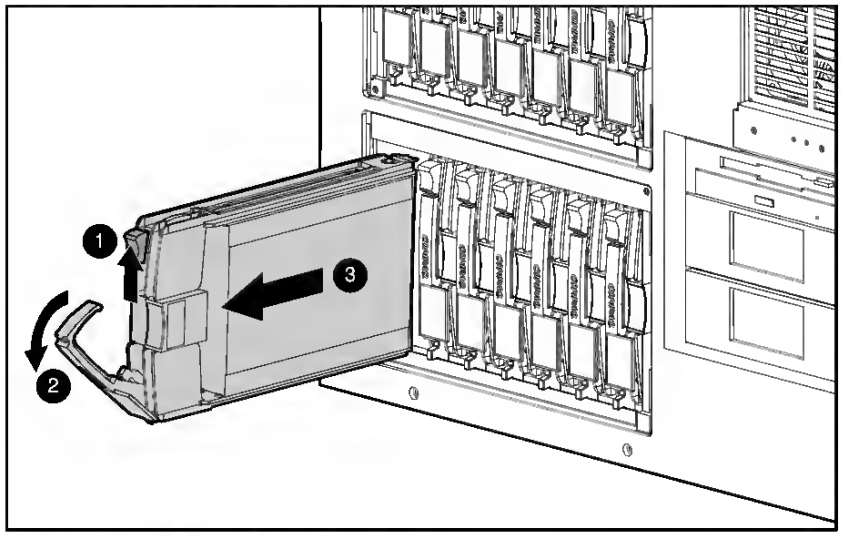

Figure 2-14. Removing a hot-plug SCSI hard drive

Reverse steps 1 through 3 to replace a hot-plug SCSI hard drive.

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Drive Cage with Backplane Board

To remove a drive cage witb backplane board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the left side access panel. See "Left Side Access Panel" earlier in this chapter.
3. Disconnect the power and SCSI cables from the backplane board.
4. Remove all drives from the drive cage. See "Hot-Plug Drive Replacement Guidelines" earlier in this chapter.

> **CAUTION:** Hard drives removed from the drive bays must be replaced into the same slots from which they were removed to preserve data integrity.

5. Remove the two slotted T-15 screws from the front of the drive cage.
6. Pull out the drive cage assembly.

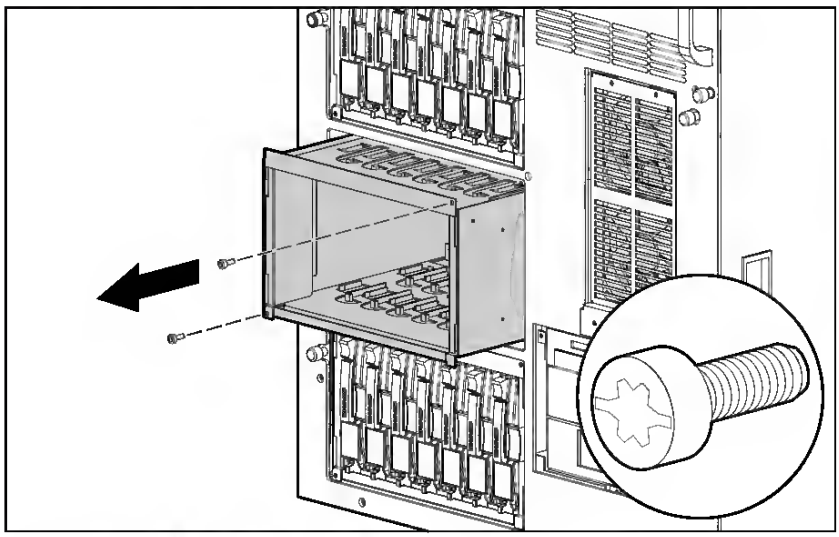

Figure 2-15. Removing the drive cage with backplane board

Reverse steps 1 through 6 to replace the drive cage with backplane board.

> **CAUTION:** If an internal drive cage bay does not contain a drive cage, you must install a hot-plug drive cage blanking panel to ensure proper system cooling.

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Power On/Standby Switch

To remove the Power On/Standby switch:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
3. Disconnect the Power On/Standby switch connector from the I/O board location shown in Figure 2-16.
4. Remove the power LED from the plastic LED holder on the chassis.

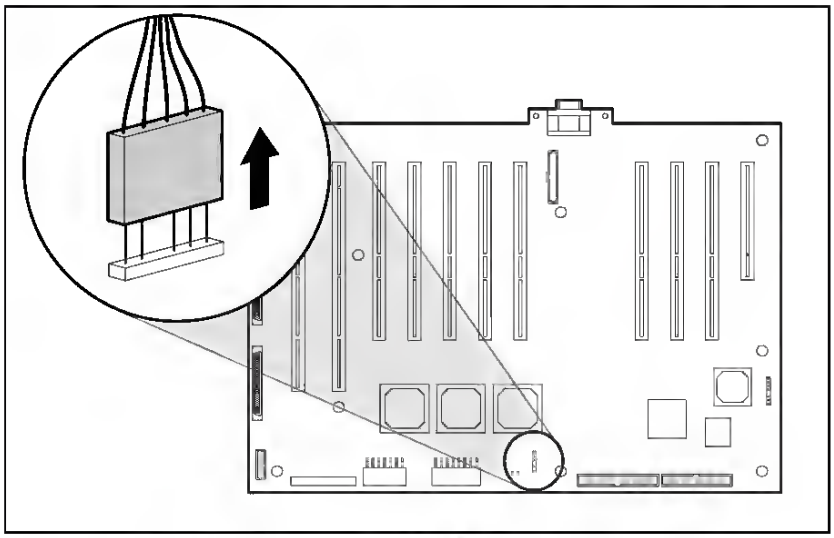

Figure 2-16. Disconnecting the Power On/Standby switch connector from the I/O board

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5. If the plastic switcb cover is installed, remove it by prying outward on tbe upper or lower catch ❶ with a 4-mm flatblade screwdriver. Tben pull the cover off the switch ❷.

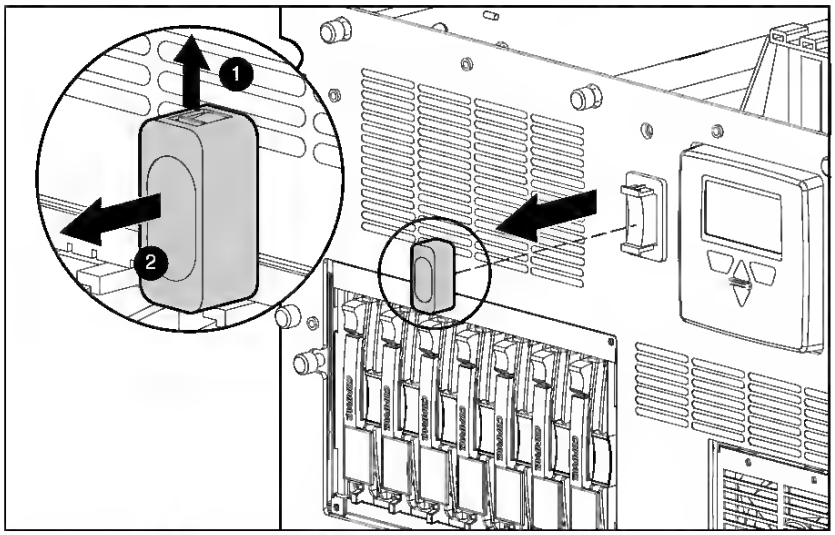

Figure 2-17. Removing the plastic switch cover

6. Press in on the release tabs ❸ on the Power On/Standby switch assembly. From behind the unit, push the assembly out of the front of the server ❹.

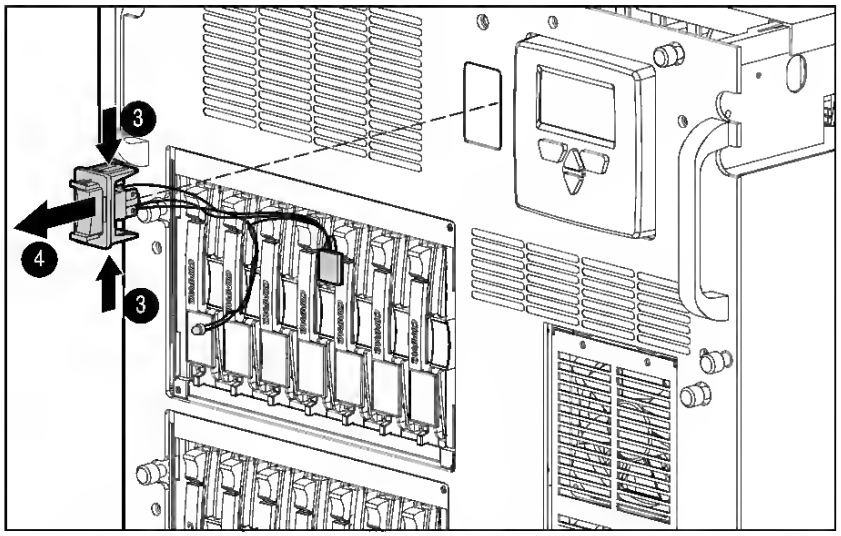

Figure 2-18. Removing the Power On/Standby switch and LED

Reverse steps 1 through 6 to replace the Power On/Standby switcb and LED.

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Power Supply Lock Bar

To remove the power supply lock bar:

1. Unlock the padlock securing the top end of the lock bar ❶.
2. Pull the top of the lock bar from its secured position ❷. Then lift the lock bar away from the server ❸.

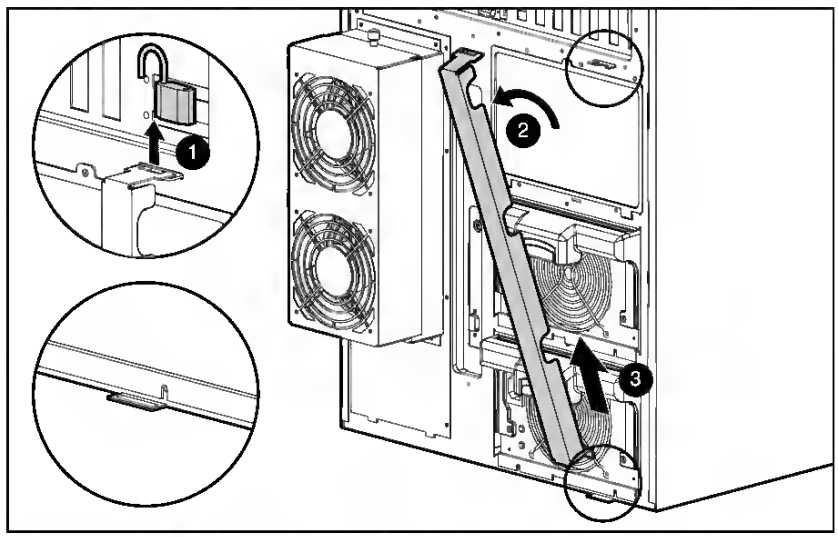

Figure 2-19. Removing the power supply lock bar from its locking position

Reverse steps 1 and 2 to replace the power supply lock bar.

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Power Supplies

Compaq ProLiant 8000 servers support up to three hot-plug power supplies. Compaq ProLiant 8000 servers ship with two hot-plug, redundant, dual-rated, load sharing, 1150-Watt power supplies in power supply bays 1 and 2. Depending on the system load configuration, more than one power supply might be required to power the system. Table 2-2 shows the minimal power supply loading requirements. To provide redundancy, add another power supply to the ones shown in Table 2-2.

Figure 2-20 shows the position of the power supplies in the rear of the server.

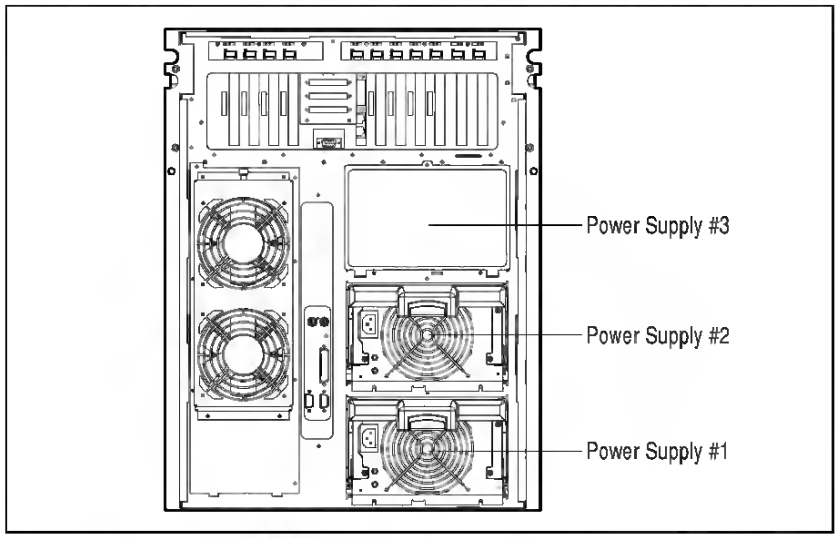

Figure 2-20. Power supply positioning (power supply #3 not shown)

CAUTION: To reduce the risk of data loss or damage to the equipment, any power supply bay that is not populated with a power supply must be covered with a power supply blanking panel. This ensures adequate airflow inside the server.

Table 2-2
Power Supply Requirements for System Load Configurations

Power Supplies Required	Power Line Voltage (VAC)	Number of Processors	Number of Hard Drives	Total Memory	Number of PCI/ISA Cards
1	110	1 to 2	2 to 4	256 MB	1 to 3
1	220	1 to 4	15 to 21	256 MB to 4 GB	3 to 8
2	110	1 to 4	5 to 9	256 MB to 4 GB	3 to 6
2	220	1 to 8	15 to 21	256 MB to 16 GB	3 to 11

Note: Compaq recommends that 220 VAC power is used for all deployments. This will ensure that the server can support its maximum configurations and remain in a redundant power supply state. This table does not imply that a given power supply configuration can support the maximum number of processors, hard drives, memory, and PCI expansion boards listed. Each power supply has a status and an AC power indicator. See Chapter 4, "Connectors, Switches, and Status Indicators," for descriptions and explanations of the power supply indicators.

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Power Supply Blanking Panel

To remove a power supply blanking panel:

1. If installed, remove the power supply lock bar. See "Power Supply Lock Bar" earlier in this chapter.
2. Remove the T-15 screw from the top of the blanking panel ❶.
3. Tilt the blanking panel outward 45 degrees. Then lift it away from the rear of the server ❷.

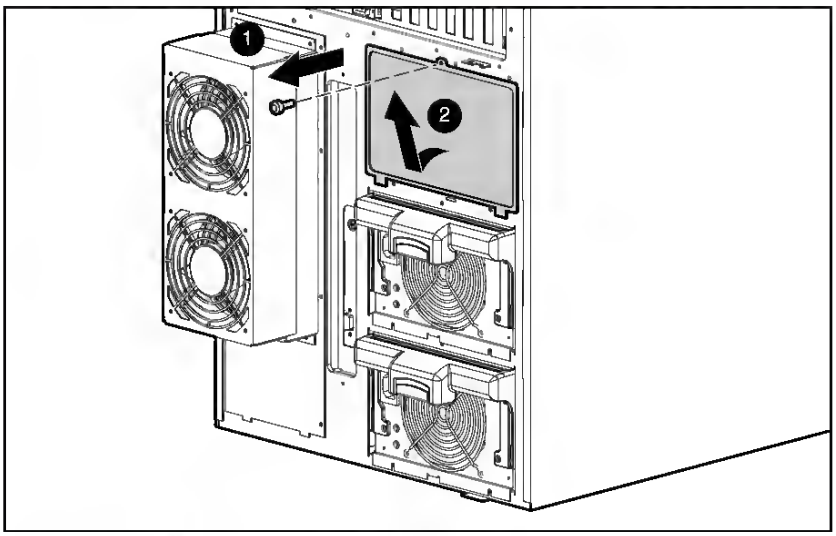

Figure 2-21. Removing a power supply blanking panel

Reverse steps 1 through 3 to replace a power supply blanking panel.

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Hot-Plug Power Supplies

To remove a hot-plug power supply:

1. In a redundant power supply configuration, it is unnecessary to turn off the power for a hot-plug power supply replacement. For a non-redundant configuration, perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.

> **CAUTION:** At least one power supply must be in place when changing out a hot-plug power supply. If all three power supplies are to be changed out, perform a server shutdown.

2. Disconnect the power cord from the power supply. Use wire cutters to snip the tie-wrap ❶, if one is present.

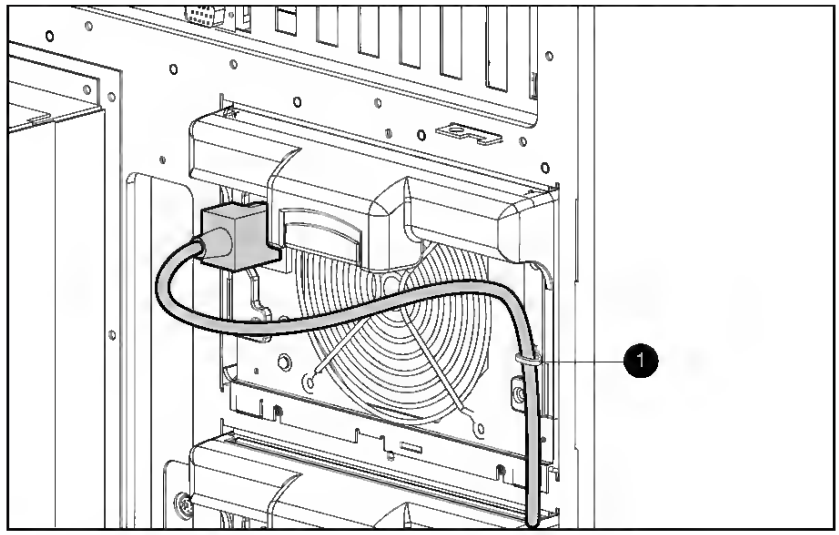

Figure 2-22. Disconnecting the power cord

3. If installed, remove the power supply lock bar. See "Power Supply Lock Bar" earlier in this chapter.

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4. Press the center release lever of the power supply handle ❶, then pull the handle downward to detach the power supply from the power backplane board ❷.
5. Using the handle, slide the power supply out the rear of the server while carefully supporting the weight of the power supply ❸.

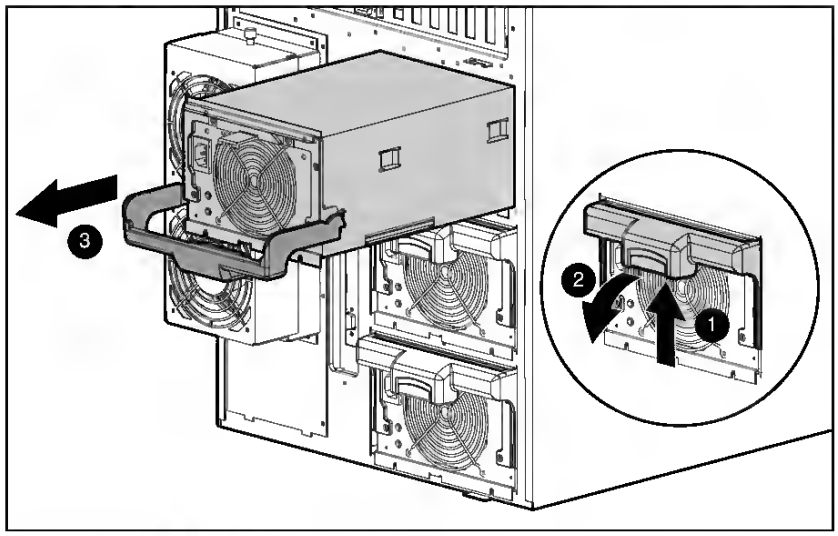

Figure 2-23. Removing a hot-plug power supply

Reverse steps 1 through 5 to replace a hot-plug power supply.

CAUTION: To reduce the risk of data loss or damage to the equipment, any power supply bay that is not populated with a power supply must be covered with a blanking panel. This ensures adequate airflow inside the server.

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Power Backplane Board

To remove the power backplane board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the left side access panel. See "Left Side Access Panel" earlier in this chapter.
3. Pull out the power supplies from the rear of the server far enough to disengage them from the power backplane board ❶. See "Hot-Plug Power Supplies" earlier in this chapter.
4. Unplug all cables from the power backplane board.
5. Loosen the two thumbscrews on the power backplane board ❷.
6. Rotate the power backplane board forward, then lift it out the left side of the server ❸.

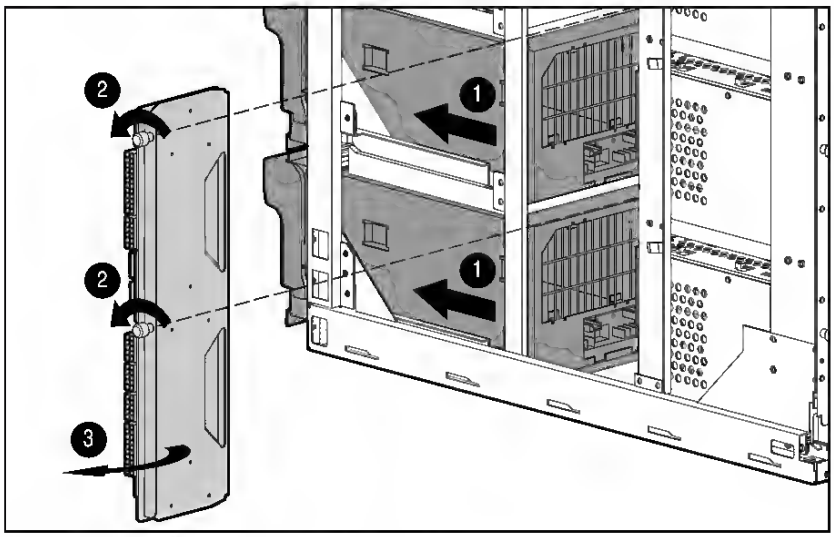

Figure 2-24. Removing the power backplane board

Reverse steps 1 through 6 to replace the power backplane board.

IMPORTANT: Ensure that the ribbon cable is installed before turning on the server. When installing the power backplane board, make sure the board is engaged in the upper and lower metal guides.

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Fans

ProLiant 8000 servers ship with 10 cooling fans. There are four fan assemblies at the processor area, two at the front and two at the rear of the server. An I/O fan assembly is located at the top of the server. All fans become active at startup. After reaching proper operating conditions, tbe redundant front and the redundant rear processor fans shut off. This is the normal fan sequence for all ProLiant 8000 servers.

Hot-Plug Rear Processor Fan

To remove the hot-plug rear processor fan:

1. Loosen the captive retaining screw at the top of the external processor fan ❶.
2. Tilt the rear processor fan back ❷ then pull it away from the chassis ❸.

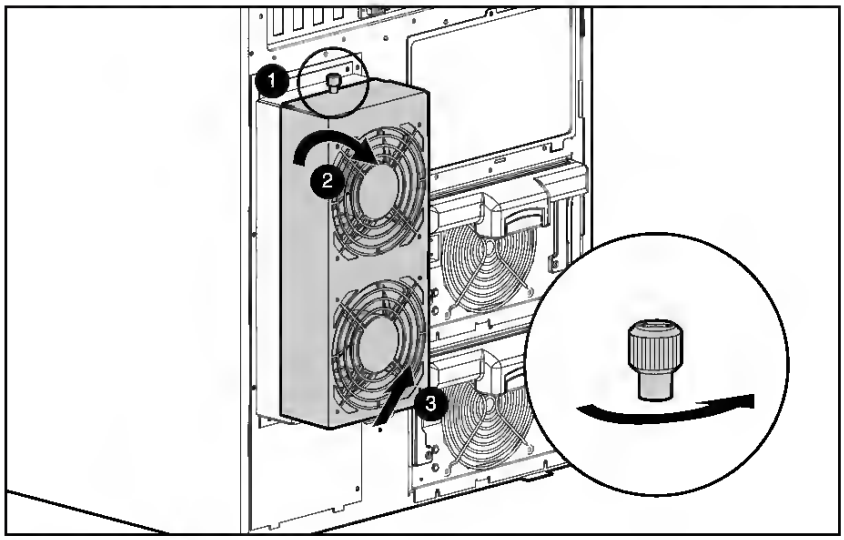

Figure 2-25 Removing the hot-plug rear processor fan

Reverse steps 1 and 2 to replace the hot-plug rear processor fan.

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Redundant Rear Processor Fan

To remove the redundant rear processor fan:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the hot-plug rear processor fan to gain access to the redundant rear processor fan retaining screws. See "Hot-Plug Rear Processor Fan" earlier in this chapter.
3. Loosen the four T-15 screws ❶ one quarter turn using a Torx screwdriver. Then remove the screws by hand.
4. Disconnect the two fan cables from the processor board ❷.
5. Pull the redundant rear processor fan out the rear of the unit ❸.

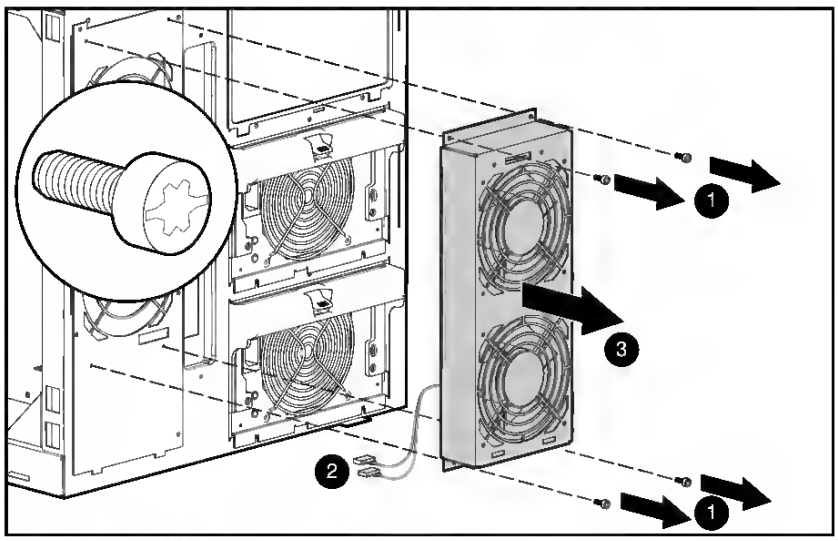

Figure 2-26. Removing the redundant rear processor fan

Reverse steps 1 through 5 to replace redundant rear processor fan.

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Hot-Plug Front Processor Fan Assembly

To remove the hot-plug front processor fan assembly:

1. Pull the lower fan ejector lever out ❶ to release the hot-plug front processor fan assembly.
2. Rotate the fan assembly up ❷. Then lift the assembly away from the front of the server.

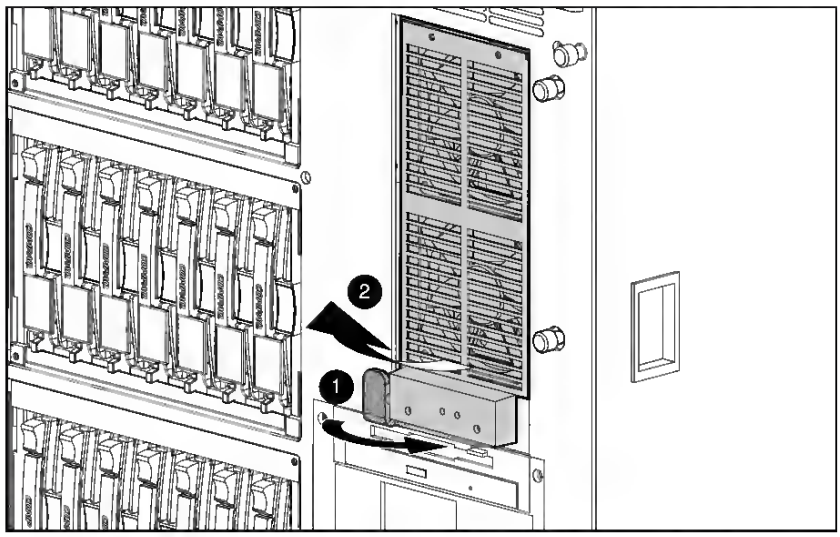

Figure 2-27. Removing the hot-plug front processor fan assembly

Reverse steps 1 and 2 to replace the hot-plug front processor fan assembly.

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Redundant Front Processor Fan Assembly

To remove the redundant front processor fan assembly:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the hot-plug front processor fan assembly. See "Hot-Plug Front Processor Fan Assembly" earlier in tbis chapter.
3. Remove the two T-15 screws from the top of tbe redundant front processor fan assembly ❶.
4. Pull the upper part of the assembly forward ❷ and unhook the bottom tab from the lower slot.
5. Unplug the fan power cable ❸ at the terminal connector.
6. Lift out the fan assembly ❹ and fan power cable.

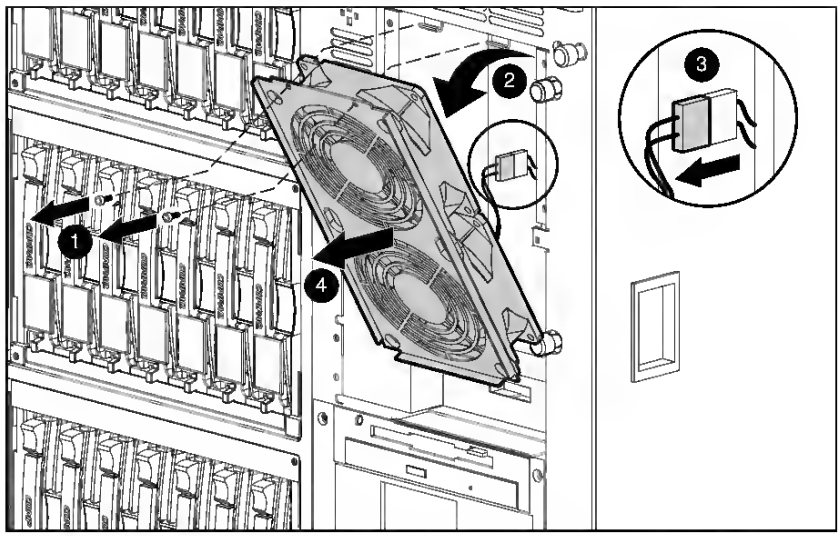

Figure 2-28 Removing the redundant front processor fan assembly

Reverse steps 1 througb 6 to replace the redundant front processor fan assembly.

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Hot-Plug Front I/O Fans

The two hot-plug front I/O fans are housed together in a cage assembly, but they can be removed individually.

> **CAUTION:** Never remove both hot-plug I/O fans while the server is powered up. Overheating and damage to hardware could result. If appropriate Compaq software drivers are installed, the operating system software will initiate a power shutdown if overheating occurs.

To remove a hot-plug front I/O fan:

1. Use the access key to unlock and open the hot-plug I/O fan access door in the top access panel ❶. See "I/O Expansion Slots and Related Components" later in this chapter.
2. Hook one finger through the thumbstrap ❷ and push the locking latch ❸ toward the thumbstrap.
3. Lift the hot-plug I/O fan out of the fan cage ❹.

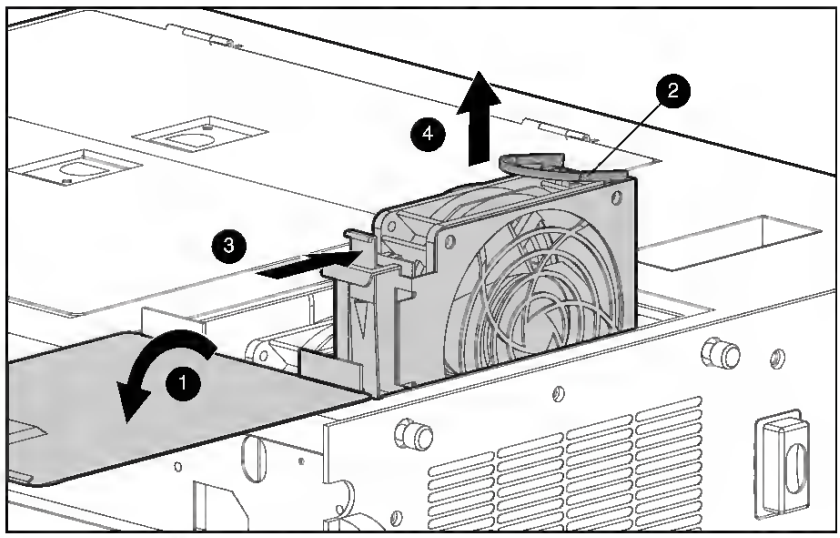

Figure 2-29. Removing a hot-plug front I/O fan

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To replace a hot-plug front I/O fan:

1. Hook one finger through the thumhstrap and push the locking latch ❶ toward the thumbstrap.
2. Securely seat the hot-plug front I/O fan into the I/O fan cage ❷.

   NOTE: An audible click should occur when the fan is fully seated.

3. Close and lock the hot-plug front I/O fan access door in the top access cover ❸.

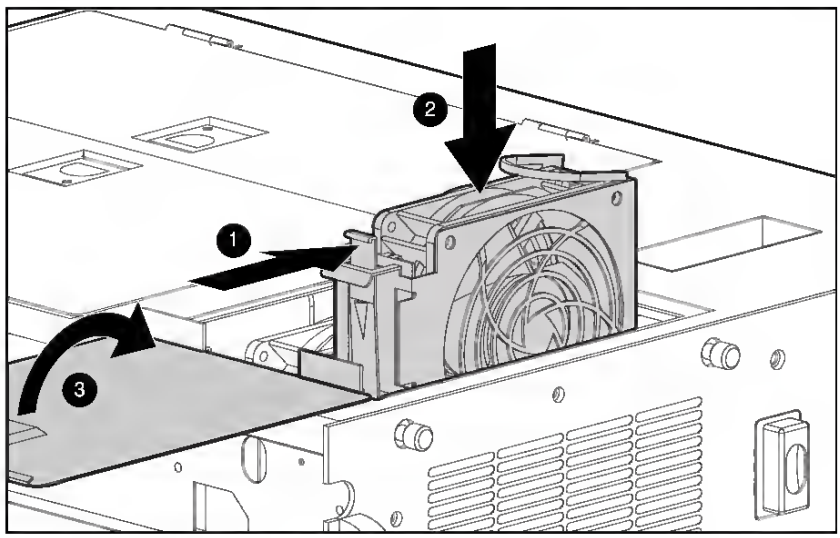

Figure 2-30. Replacing a hot-plug front I/O fan

NOTE: When a hot-plug front I/O fan is properly installed, the fan produces air flow and the fan LED light is green.

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Hot-Plug I/O Fan Board

To remove the hot-plug I/O fan board:

1. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
2. Remove the bot-plug front I/O fans. See "Hot-Plug Front I/O Fans" earlier in this chapter.
3. Remove the two Torx T-8 screws securing the hot-plug I/O fan board to the fan cage ❶.
4. Slide the board from beneatb the bot-plug I/O fan cage, then lift it out of the server ❷.

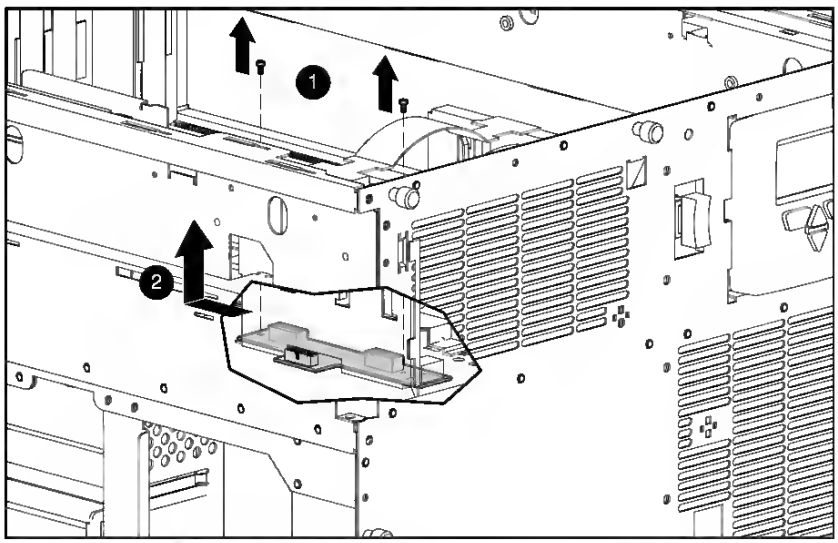

Figure 2-31. Removing the hot-plug I/O fan board

Reverse steps 1 through 4 to replace the hot-plug I/O fan board.

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SDRAM Memory

Compaq ProLiant 8000 servers use industry-standard synchronous dynamic RAM (SDRAM) dual inline memory modules (DIMMs) with single-bit error correction and single/multiple-bit error detection down to a single DIMM. Memory is expandable to 16 GB (16 x 1-GB DIMMs) by using all 16 DIMM sockets, two DIMM sockets to a bank. Both DIMMs in a bank must be the same size, type, and speed, and both DIMMs in a bank must be installed at the same time.

Compaq ProLiant 8000 servers support 128-MB, 256-MB, 512-MB, and 1-GB 100-MHz SDRAM DIMMs.

IMPORTANT: The Power-On Self-Test (POST) warns of non-supported DIMMs. Mixing of memory speeds on a memory expansion board is allowed, but the memory expansion board will run at the slowest memory speed installed.

Dual Inline Memory Modules

Table 2-3 gives examples of DIMM upgrade combinations for Compaq ProLiant 8000 servers.

Table 2-3
Examples of DIMM Upgrade Combinations

Total Memory	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
512 MB	2 x 128 MB	2 x 128 MB						
1 GB	2 x 128 MB	2 x 128 MB	2 x 128 MB	2 x 128 MB				
1.5 GB	2 x 128 MB	2 x 128 MB	2 x 128 MB	2 x 128 MB	2 x 128 MB	2 x 128 MB		
2 GB	2 x 256 MB	2 x 256 MB	2 x 256 MB	2 x 256 MB				
4 GB	2 x 256 MB	2 x 256 MB	2 x 256 MB	2 x 256 MB	2 x 256 MB	2 x 256 MB	2 x 256 MB	2 x 256 MB
4.0 GB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB				
6.1 GB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB		
8 GB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB	2 x 512 MB
16 GB	2 x 1 GB	2 x 1 GB	2 x 1 GB	2 x 1 GB	2 x 1 GB	2 x 1 GB	2 x 1 GB	2 x 1 GB

IMPORTANT: Compaq recommends using only Compaq DIMMs. DIMMs from other sources can adversely affect data integrity. Refer to the *Compaq ProLiant 8000 Setup and Installation Guide* for information on achieving optimum performance of the memory system.

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Memory Expansion Board

Figure 2-32 shows the DIMM socket and memory bank locations on the memory expansion board for ProLiant 8000 servers.

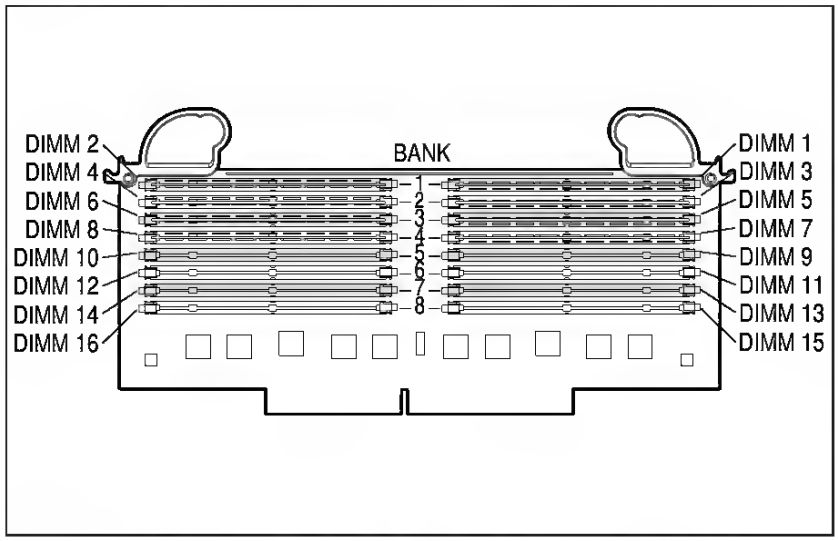

Figure 2-32. DIMM socket and memory bank locations on the memory expansion board

CAUTION: Compaq recommends using only Compaq DIMMs. DIMMs from other sources might adversely affect data integrity.

IMPORTANT: Memory must be installed in identical pairs. Ensure all modules in a logical bank of two have the same 9-digit Compaq part number. Populate bank 1 (slots 1 and 2) first. Continue populating the memory banks in sequential order. Populate bank 8 last. If the memory is not matched as stated, then the server will experience POST Error 207.

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To remove the memory expansion board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Remove the memory expansion board retention bracket by loosening the thumbscrew ❶, swinging the left side of the bracket out of the slot ❷, and then pulling the bracket to the left and out the side of the unit ❸.

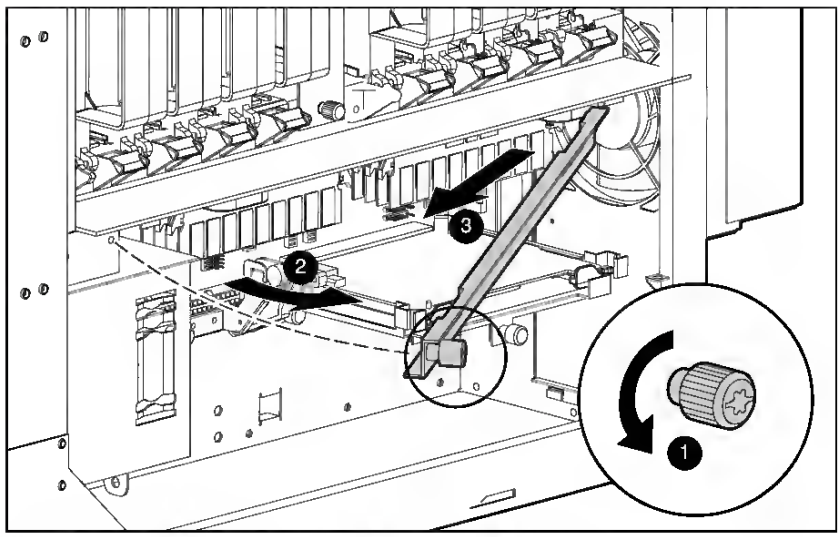

Figure 2-33. Removing the memory expansion board retention bracket

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4. Rotate the ejector levers outward ❹ on each side of the memory expansion board. Then slide the board out of the server ❺.

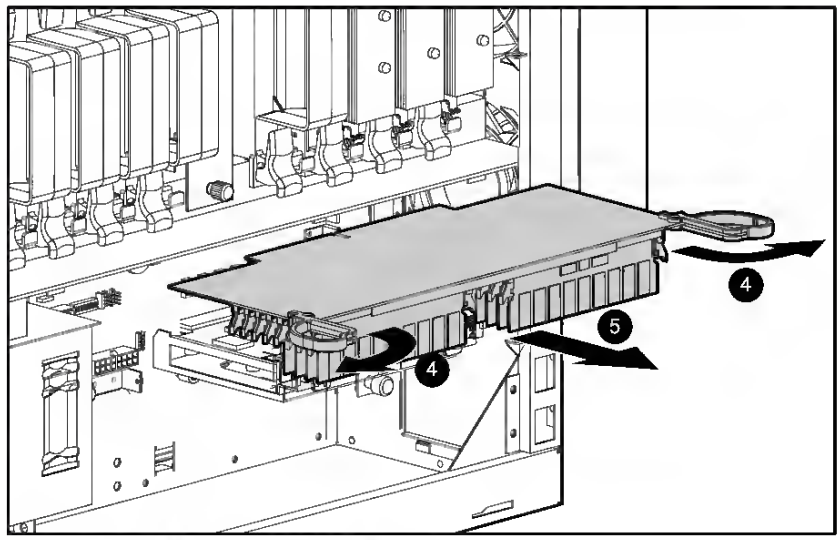

Figure 2-34. Removing the memory expansion board

Reverse steps 1 through 4 to replace the memory expansion board.

IMPORTANT: When installing a memory expansion board, verify that the board aligns with the connectors on the processor board. If the memory expansion board is not properly seated, the system interlock circuitry prevents the system from powering up.

IMPORTANT: Secure the thumbscrews in order for the unit to operate properly. See the warning label on the processor board cage for the service screw locations.

NOTE: Remember to remove any memory modules from the replaced memory expansion board and insert them into the proper sockets on the new memory expansion board.

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To remove a DIMM:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the memory expansion board containing the DIMM modules. See "Memory Expansion Board" earlier in this chapter.
3. Support the underside of the memory expansion board.

CAUTION: The ejectors prevent the memory expansion board from lying completely flat. Inserting a DIMM without proper support behind the socket on the expansion board can cause the board to flex and could result in damage to the board.

4. Push down on the release levers at each end of the selected DIMM ❶.
5. Lift the DIMM from the memory expansion board ❷.

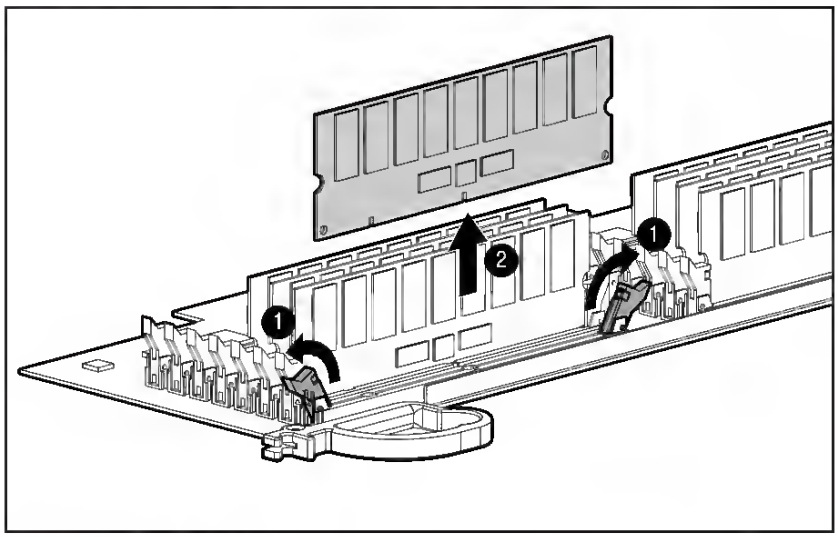

Figure 2-35. Removing a DIMM

Reverse steps 1 through 5 to replace a DIMM. Align the key slot on the bottom edge of each DIMM with the tab in the DIMM socket before seating the DIMM in the socket. If the alignment notches do not line up, it is not the correct memory specification.

IMPORTANT: Be certain the release levers are completely closed.

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Cache Accelerators

Cache accelerators are found where more than one processor bus is used. Figure 2-36 shows the location of cache accelerators ❶ and ❷.

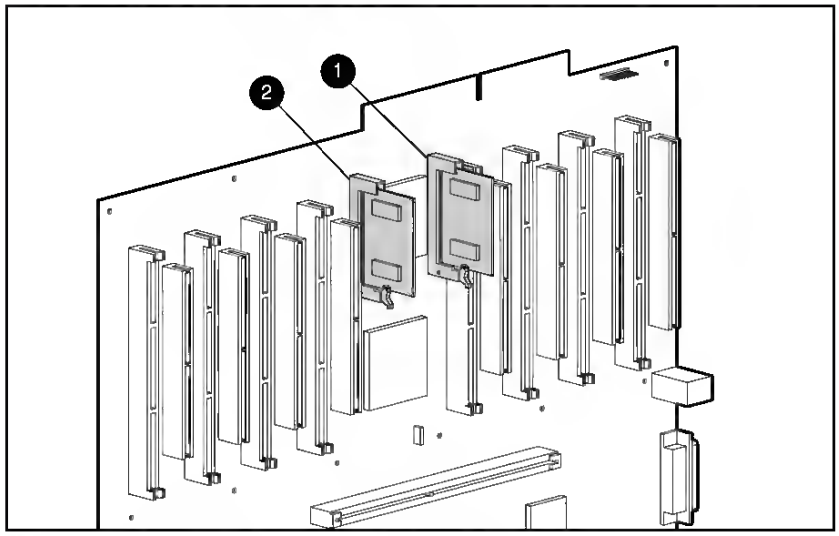

Figure 2-36 Cache accelerators

CAUTION: Cache accelerators are susceptible to damage from electrostatic discharge. Do not touch the metal chassis while removing the accelerators.

IMPORTANT: For best performance, install the first four processors in processor slots 1-4. Cache accelerators must be used if processors are installed on both buses.

Operating the server with processors installed in both buses but without the cache accelerators will prevent the system from booting and will cause an error message to be displayed.

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To remove a cache accelerator:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Rigbt Side Access Panel" earlier in this chapter.
3. Remove the main processor air baffle. See "Main Processor Air Baffle" earlier in this chapter.
4. Remove the processor support brace by loosening the two thumbscrews ❶. Then pull the brace away from the server ❷.

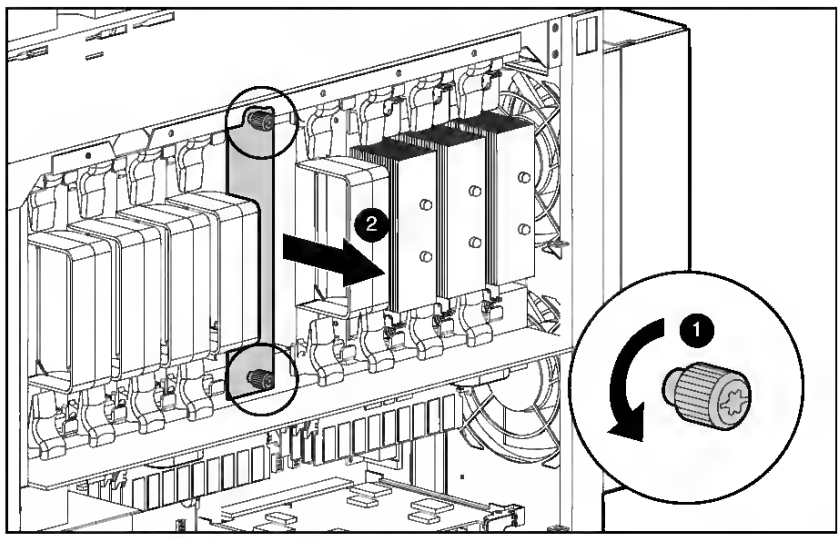

Figure 2-37. Removing the processor support brace

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5. Open the lower ejector tab securing the cache accelerator ❸.
6. Remove the accelerator from the socket ❹.

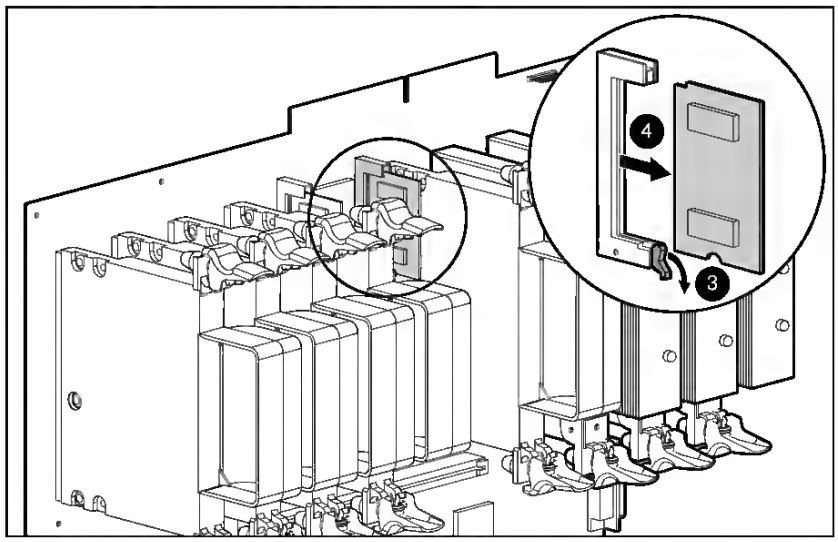

Figure 2-38. Removing a cache accelerator

Reverse steps 1 through 6 to replace a cache accelerator.

After replacing the cache accelerator, complete the following steps to clear the cache accelerator POST Error 220.

1. Reboot the server and press **F9** to enter the ROM-based System Configuration Utility.
2. When in the utility, select Advanced Options.
3. Select Set Cache Accelerator Corrected.
4. Select the slot that has been corrected (1 or 2).
5. Press **ESC** twice and then **F10** to save.

At this point the bit in NVRAM is cleared. If the cache accelerator replacement has been successful, then POST Error 220 will no longer display at reboot.

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Processors, Processor Power Modules, Processor Terminator Boards, Processor Board with Tray

The processor board with tray seats up to eight processors and eight Processor Power Modules.

> **CAUTION:** Terminator boards must be installed in each unoccupied processor slot to complete the system interlock feature.

Figure 2-39 and Table 2-4 show processor, Processor Power Module, and terminator slot numbers and locations.

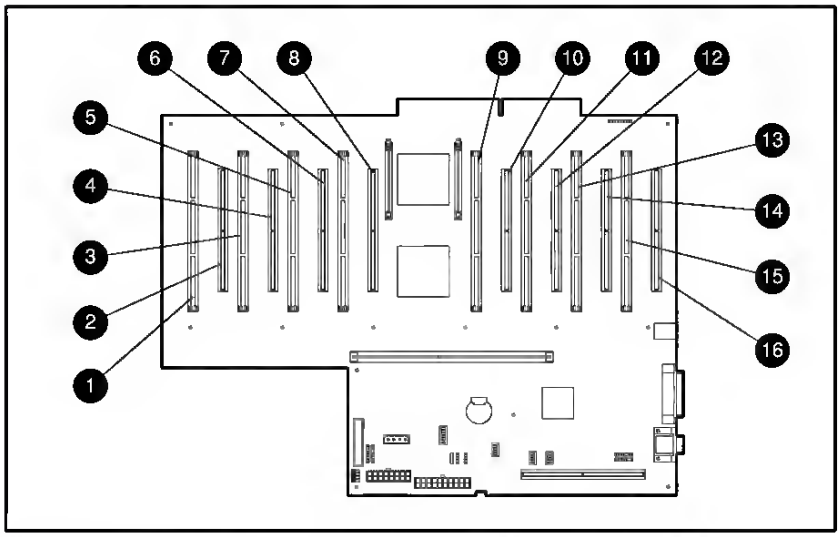

Figure 2-39. Processor, Processor Power Module, and terminator board slot locations

Table 2-4
Processor Board Slot Locations

Item	Description	Item	Description
❶	Processor slot 8	❾	Processor slot 4
❷	Processor Power Module 8	❿	Processor Power Module 4
❸	Processor slot 7	⓫	Processor slot 3
❹	Processor Power Module 7	⓬	Processor Power Module 3
❺	Processor slot 6	⓭	Processor slot 2
❻	Processor Power Module 6	⓮	Processor Power Module 2
❼	Processor slot 5	⓯	Processor slot 1
❽	Processor Power Module 5	⓰	Processor Power Module 1

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Processor

Each processor bus in ProLiant 8000 servers supports four processors. Figure 2-40 illustrates how the processors are properly removed using the ejectors.

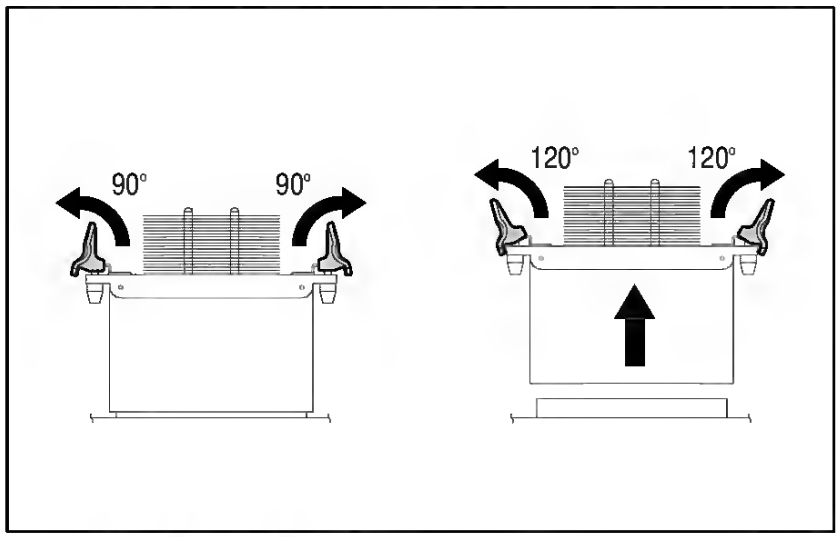

Figure 2-40. Unlocking and ejecting the processor

To remove a processor:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Remove the main processor air baffle. See "Main Processor Air Baffle" earlier in this chapter.
4. Unlock the processor by opening the side ejector levers outward 90 degrees.

NOTE: Processor side ejectors unlock at 90 degrees and eject the processor from the processor slot at 120 degrees.

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5. Eject the processor from the processor slot by opening the ejector levers 120 degrees ❶.
6. Remove the processor from the processor slot ❷.

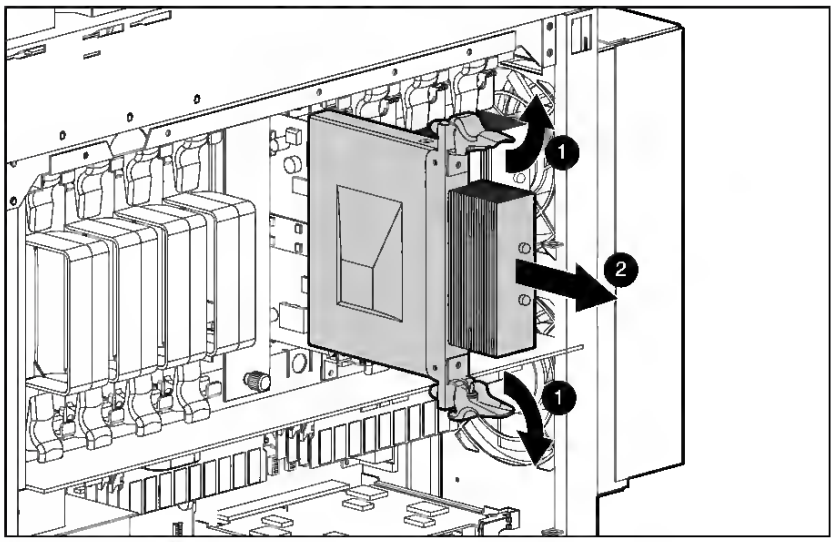

Figure 2-41. Removing a processor

When installing new processors, follow these guidelines:

- Use Intel Pentium III Xeon processors. ProLiant 8000 servers do not support Pentium II Xeon processors.
- ProLiant 8000 servers will not boot if Intel Pentium III Xeon 500/550-MHz processors and Pentium III Xeon 700-MHz or higher speed processors are installed in the same server.
- When installing processors, be sure to install tbe Processor Power Module first.
- Processors must be installed starting from the slot closest to the rear of the server (slot 1).
- Each pair of processor slots must contain processors of the same cache size (processor slot pairs are Slots 1 and 2; Slots 3 and 4; Slots 5 and 6; and Slots 7 and 8). If there is no match for a processor, tbe second slot in the pair must be filled with a processor terminator board.
- The processor pair with the lowest cache size should be installed in the lowest numbered processor slot. If a second pair of processors has a larger cache size, it should be installed in the next pair of slots.
- The cache size of processors on a bus must not differ by more than two cache size options.
- All slots must have either a processor or terminator board installed.

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Table 2-5 shows examples of processors installed using these guidelines.

Table 2-5
Examples of Processor Mixing by Cache Size

Example	Processors 1 and 2	Processors 3 and 4	Processors 5 and 6	Processors 7 and 8
1	1 MB	1 MB	1 MB	2 MB
	1 MB	1 MB	Terminator Board	2 MB
2	1 MB	2 MB	2 MB	Terminator Board
	1 MB	2 MB	Terminator Board	Terminator Board

With the bus/core ratio switches in the default position, the system ROM automatically detects the speed of processors installed on both processor buses. The processors automatically run at the speed of the slowest processor installed in the server.

The default setting for the bus/core ratio switches has all switches in the Off position. Compaq recommends that the bus/core ratio switches remain on the default setting to allow the system ROM to detect the correct speed automatically. If necessary, the bus/core ratio switches can be manually set to force processor speed settings. See "Processor Board Bus/Core Frequency Ratio Switch Settings" in Chapter 4 for manual bus/core frequency switch settings.

CAUTION: If the bus/core ratio switches are set to a speed higher than the slowest processor, the server will not boot. Failure to properly set the bus/core ratio switches could damage the server and void the warranty.

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To install a processor:

CAUTION: When installing processors, be sure to install the Processor Power Module first to ensure proper processor operation.

1. Gently guide the processor into the processor slot.

IMPORTANT: If the processor is not properly seated, the system interlock prevents the system from powering up.

2. Fully seat the processor ❶.

NOTE: The processor is keyed to ensure correct alignment.

CAUTION: Do not lock the ejector levers before fully seating the processor into the slot.

IMPORTANT: When installing a processor, push down on both levers simultaneously. The server may not recognize the processor if it is not properly installed.

3. Push both side ejector levers on the processor inward ❷ to lock the processor in place.

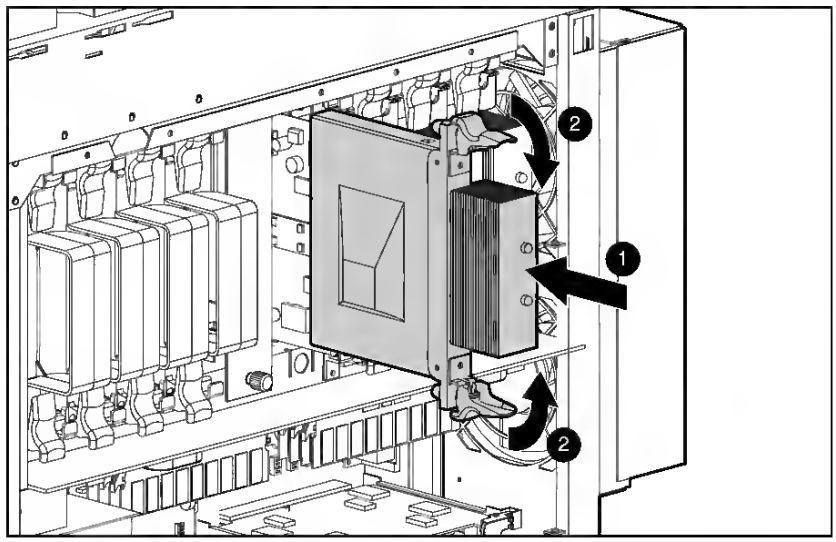

Figure 2-42. Installing a processor

4. Replace the main air baffle and access covers.
5. Restart the server.

IMPORTANT: Verify that the processor board bus/core switch settings are correct. See Chapter 4, "Connectors, Switches, and Status Indicators," for the correct bus/core switch settings.

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Processor Power Modules

The Processor Power Modules (whicb are also called VRMs) of Compaq ProLiant 8000 servers have built-in redundancy to prevent the system from powering down if a Processor Power Module fails. There is one redundant Processor Power Module per server. The redundant Processor board Processor Power Module (ninth VRM), located below tbe eight processor slots, ships with every server model.

To remove the redundant processor board Processor Power Module:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the rigbt side access panel. See "Rigbt Side Access Panel" earlier in this cbapter.
3. Loosen the thumbscrew securing the Processor Power Module support bracket. Then pull out the bracket ❶.
4. Rotate the side ejector levers on the module outward ❷. Then slide the module out the right side of the server ❸.

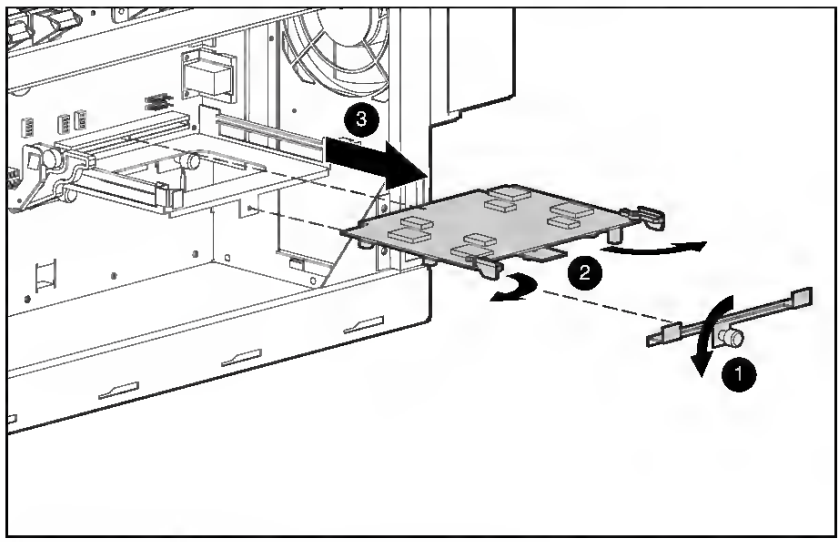

Figure 2-43. Removing the processor board Processor Power Module

Reverse steps 1 through 4 to replace the processor board Processor Power Module.

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To remove a Processor Power Module:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Remove the main processor air baffle. See "Main Processor Air Baffle" earlier in this chapter.
4. Remove the processor associated with the Processor Power Module being replaced. Refer to Figure 2-39 and the "

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Processors, Processor Power Modules, Processor Terminator Boards, Processor Board with Tray" section earlier in this chapter.

5. Rotate the side ejector levers on the module outward ❶. Then slide the module out the right side of the server ❷.

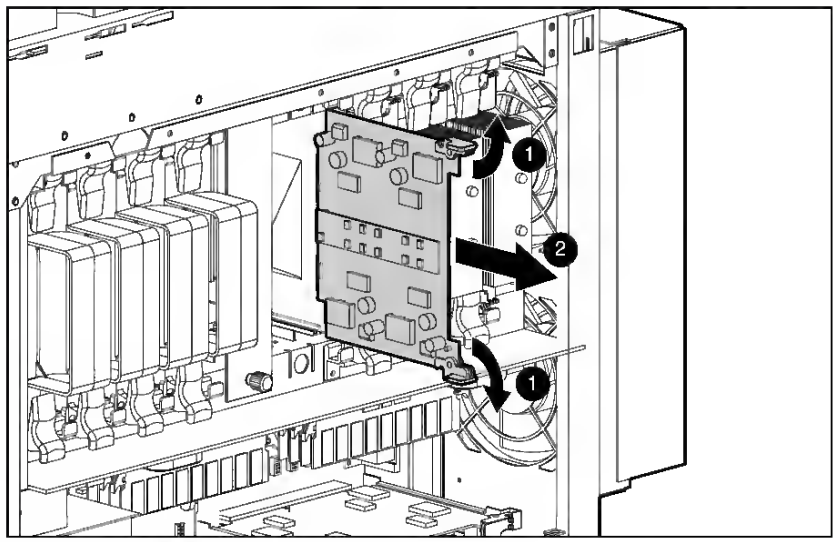

Figure 2-44. Removing a Processor Power Module

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To install a Processor Power Module:

CAUTION: The redundant Processor Power Module must be installed before the processor. Attempting to install the Processor Power Module after installing the processor could damage the electronic components on the Processor Power Module.

1. Line up the Processor Power Module with the guides in the processor cage at the appropriate processor board slot ❶.
2. Open the Processor Power Module ejector levers to 90 degree angles. Then fully seat the Processor Power Module into its processor board slot.

CAUTION: Do not push the Processor Power Module into place by pushing on the ejector levers.

3. Push the Processor Power Module onto the processor board until the levers lower to a flat position ❷.

NOTE: An audible click should occur, indicating that the Processor Power Module is fully seated.

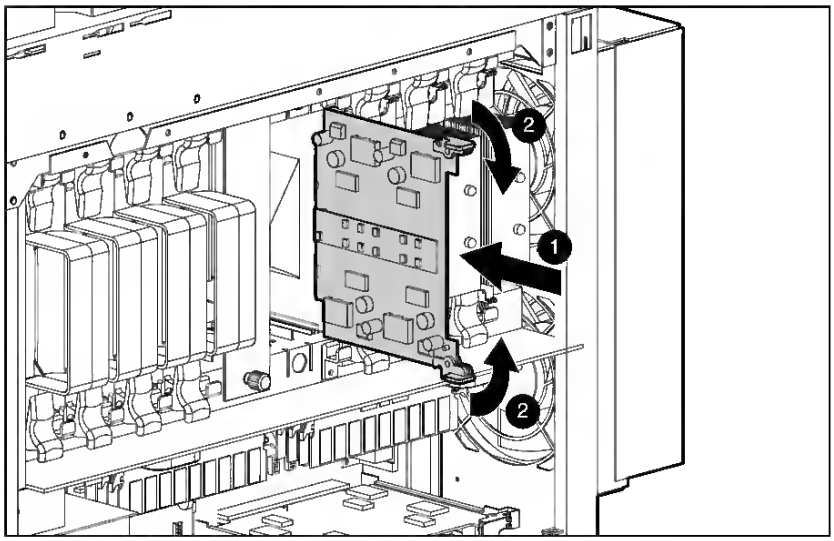

Figure 2-45. Replacing a Processor Power Module

NOTE: The Processor Power Module is keyed for correct alignment.

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Processor Terminator Boards

Processor terminator boards occupy unused processor sockets on the processor board.

To remove a processor terminator board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Remove the main processor air baffle. See "Main Processor Air Baffle" earlier in this chapter.
4. Rotate the side ejector levers on the processor terminator board outward approximately 120 degrees ❶, then slide the processor terminator board out the right side of the server ❷.

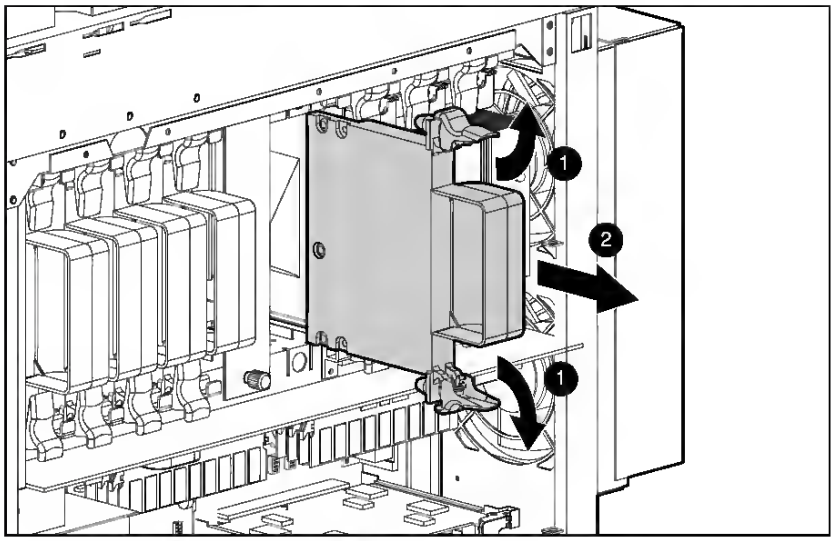

Figure 2-46. Removing a processor terminator board

Reverse steps 1 through 4 to replace a processor terminator board.

IMPORTANT: If the processor terminator board is not properly seated, the system interlock prevents the system from powering up.

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Lower Processor Support Structure

To remove the lower processor support structure:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Remove the front and rear air baffles. See "Front Air Baffle" and "Rear Air Baffle" earlier in this chapter.
4. Remove the main processor air baffle. See "Main Processor Air Baffle" earlier in this chapter.
5. Remove all processors, Processor Power Modules, and terminator boards. See "

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Processors, Processor Power Modules, Processor Terminator Boards, Processor Board with Tray" earlier in this chapter.

6. Remove the processor support brace. See "Cache Accelerators" earlier in this chapter.
7. Loosen the two thumbscrews at each end of the lower processor support structure ❶.
8. Move the lower processor support structure forward slightly. Then pull it out from the right side of the chassis ❷.

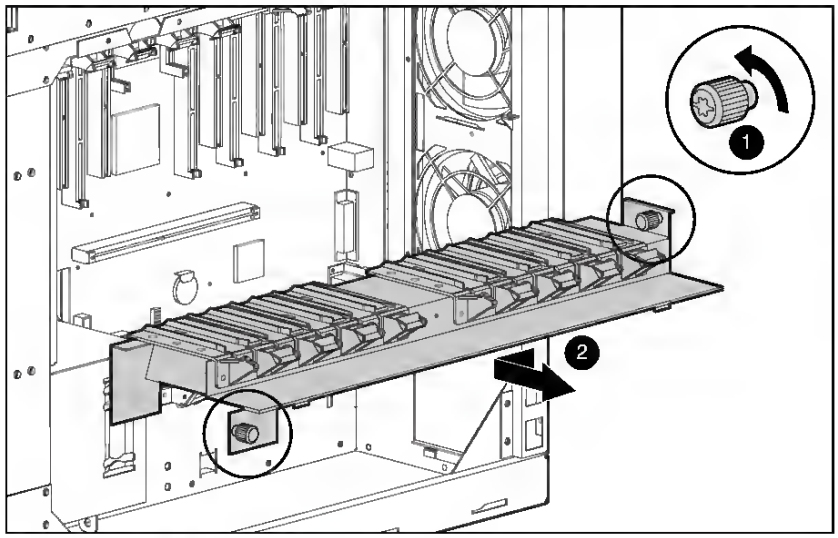

Figure 2-47. Removing the lower processor support structure

Reverse steps 1 through 8 to replace the lower processor support structure.

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Upper Processor Support Structure

To remove the upper processor support structure:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the lower processor support structure. See "Lower Processor Support Structure" earlier in this chapter.
3. Remove the five T-15 screws located along the top of the upper processor support structure.
4. Pull out the upper processor support structure.

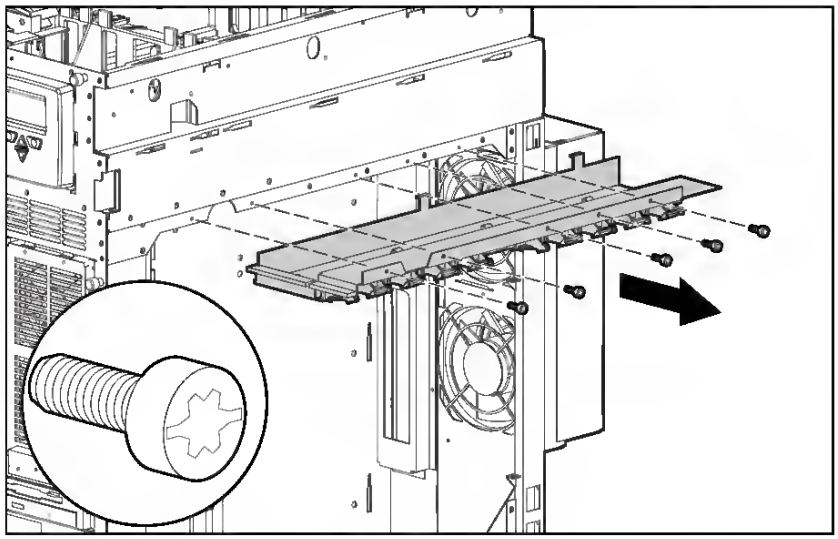

Figure 2-48. Removing the upper processor support structure

Reverse steps 1 through 4 to replace the upper processor support structure.

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Processor Board with Tray

To remove the processor board with tray:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
3. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
4. Remove the memory expansion board. See "Memory Expansion Board" earlier in this chapter.
5. Remove the main processor air baffle. See "Main Processor Air Baffle" earlier in this chapter.
6. Remove all Processor Power Modules except the Processor board Processor Power Module (ninth VRM), processors, and terminator boards. See "

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Processors, Processor Power Modules, Processor Terminator Boards, Processor Board with Tray" earlier in this chapter.

7. Remove the front and rear air baffles. See "Front Air Baffle" and "Rear Air Baffle" earlier in this chapter.

8. Loosen the two processor support brace thumbscrews ❶. Then lift out the processor support brace ❷.

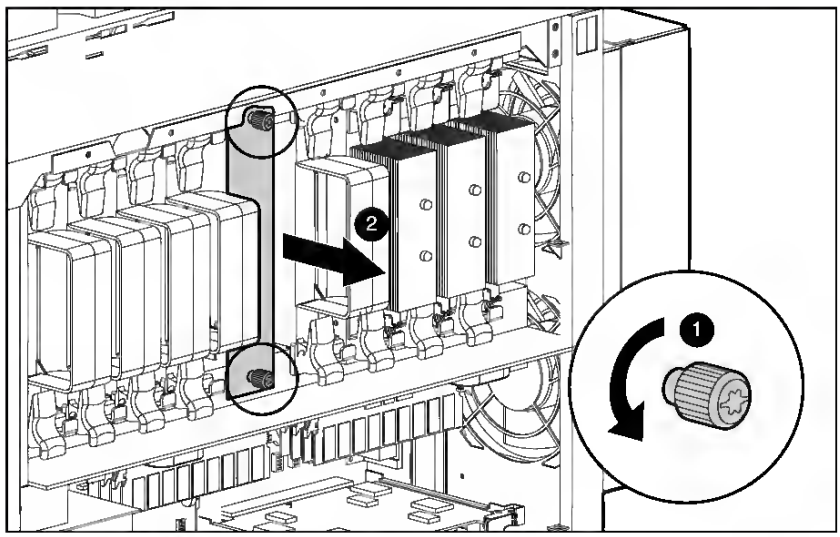

Figure 2-49. Removing the processor support brace

9. Remove the lower processor support structure. See "Lower Processor Support Structure" earlier in this chapter.

10. Remove the Processor board Processor Power Module (ninth VRM). See "Processor Power Modules" earlier in this chapter.

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11. Loosen the two thumbscrews ❸ securing the Processor board Processor Power Module support structure. Then remove the support structure ❹ from the processor board.

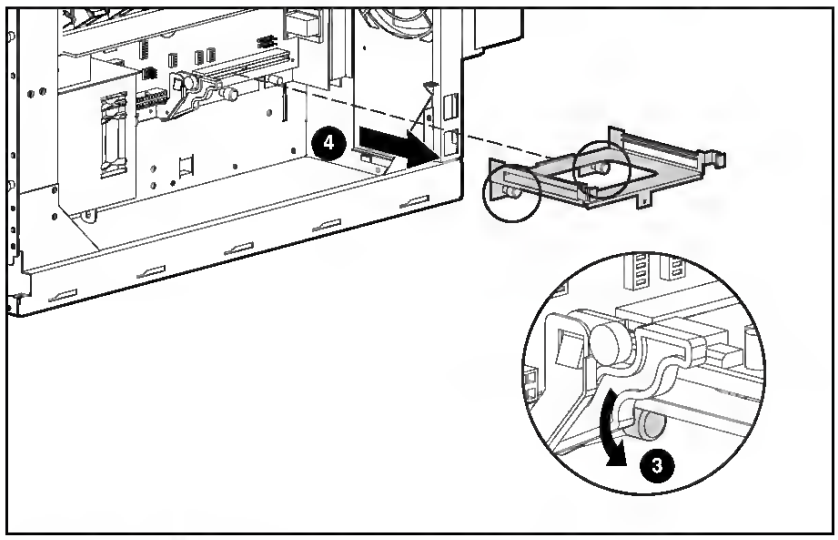

Figure 2-50. Removing the Processor board Processor Power Module support structure

12. Disconnect all internal cables from the processor board.
13. Disconnect the exterior serial port keyboard, mouse, and printer cables from the rear of the I/O board.
14. Loosen the two thumbscrews securing the I/O board to the processor board ❺.

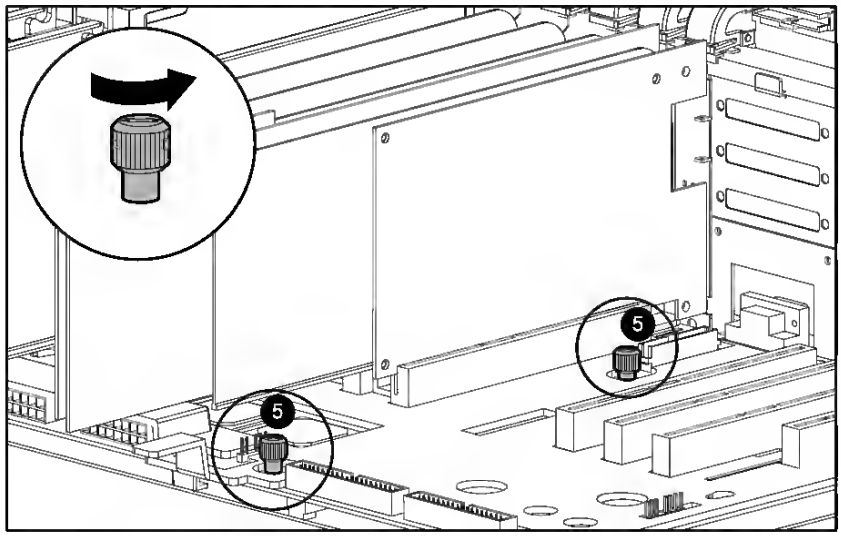

Figure 2-51. Loosening the two thumbscrews joining the I/O (system) and processor boards

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15. Loosen the two thumbscrews securing the processor board with tray to the chassis ❻.
16. Press the lock lever button with a finger or thumb ❼ and pull down the processor board handle ❽.
17. Lower the processor board with tray from the back of the chassis ❾. Then tilt and unhook the board from the chassis ❿.

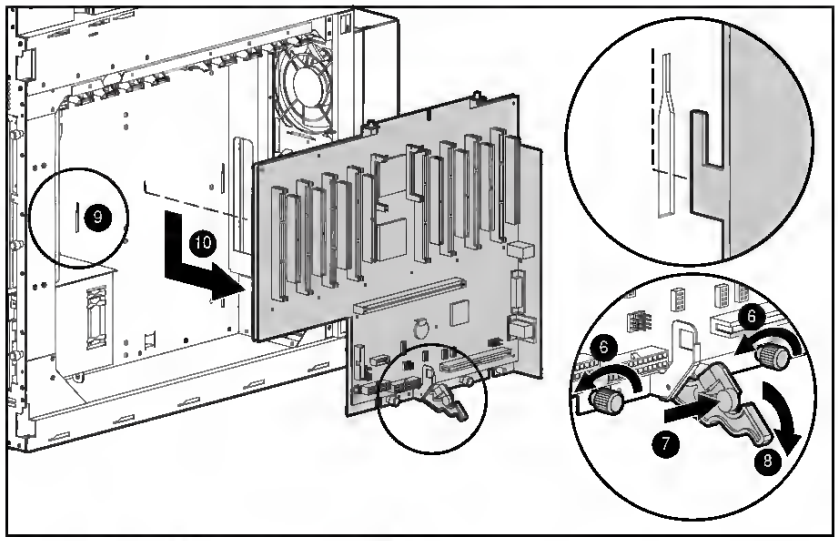

Figure 2-52 Removing the processor board with tray

Reverse steps 1 through 17 to replace the processor board with tray.

IMPORTANT: If the processor board is not properly seated, the system interlock prevents the system from powering up. Secure the service thumbscrews so the unit will operate properly. See the warning label on the processor board cage for the service screw locations.

NOTE: Ensure that all cables are out of the way when reseating the processor board and tray.

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Integrated Management Display

To remove the Integrated Management Display (IMD):

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
3. Disconnect the IMD cable from the I/O board.
4. Press in on the four locking tabs on the rear of the IMD ❶
5. Pull the IMD from the front of the server ❷.

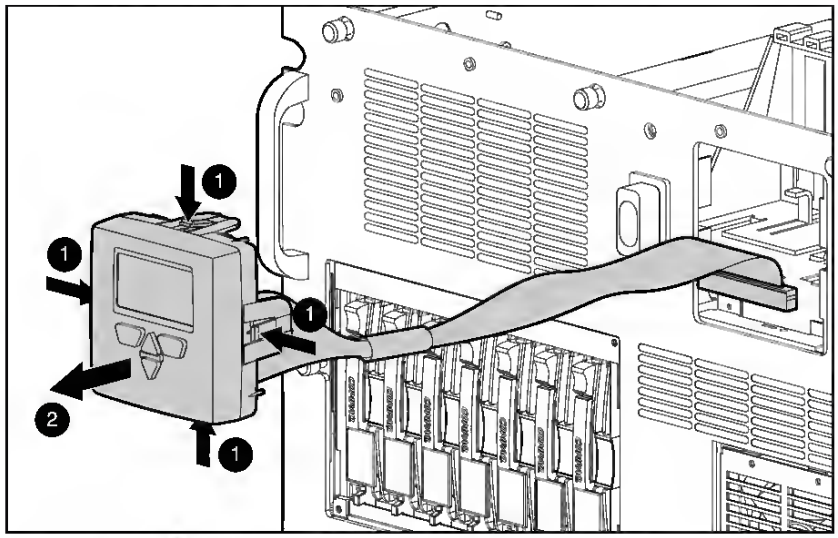

Figure 2-53. Removing the IMD

Reverse steps 1 through 5 to replace the IMD.

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I/O Expansion Slots and Related Components

The I/O expansion slots are located on the I/O board directly beneath the top access panel and are accessed using the PCI Hot Plug access doors.

To access the I/O expansion slots:

1. Insert the access key into the PCI Hot Plug access door and turn it counter-clockwise ❶.

NOTE: Compaq recommends leaving the PCI Hot Plug access doors locked during normal use.

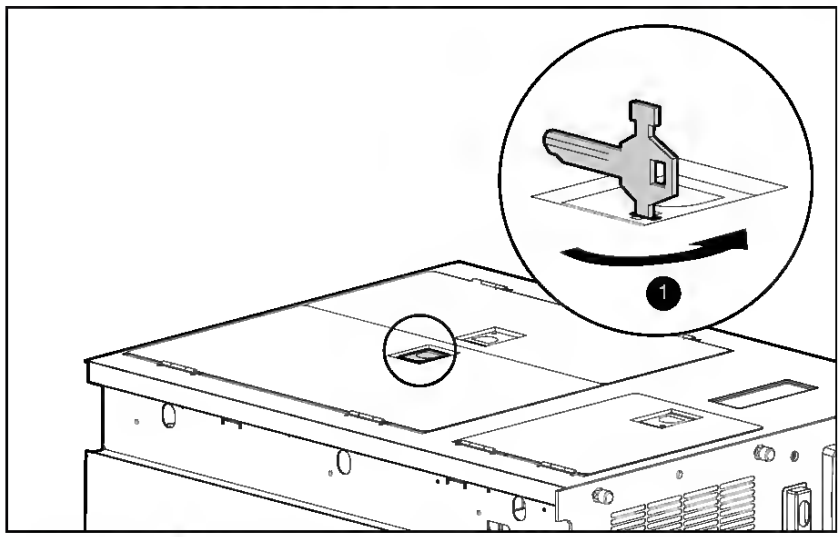

Figure 2-54. Unlocking the PCI Hot Plug access doors

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

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2. Slide back the locking lever on the PCI Hot Plug access door ❷.
3. Open the PCI Hot Plug access doors ❸.

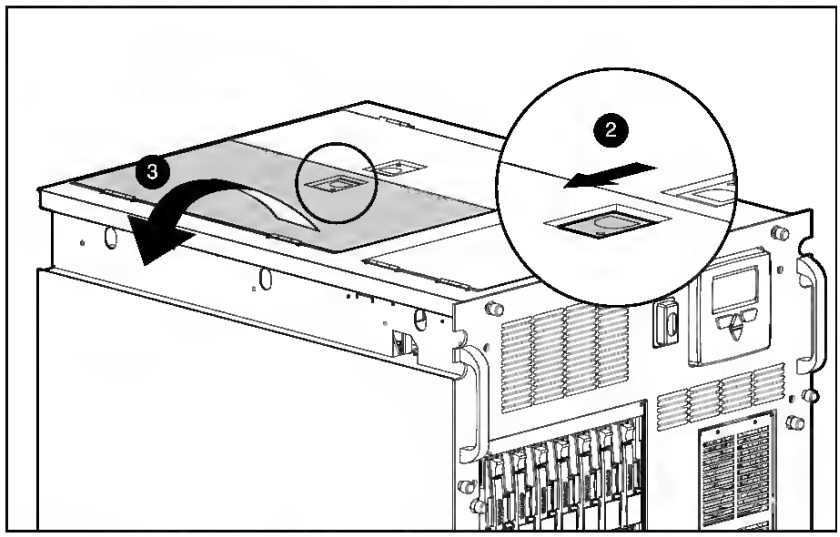

Figure 2-55. Opening the PCI Hot Plug access doors

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Figure 2-56 shows the Compaq ProLiant 8000 I/O expansion board slot positions from the top of the server and; Figure 2-57 shows the slot positions from the back of the server. Table 2-6 shows which devices the slots can support.

NOTE: The I/O expansion board slots are numbered from right to left as you face the front of the server.

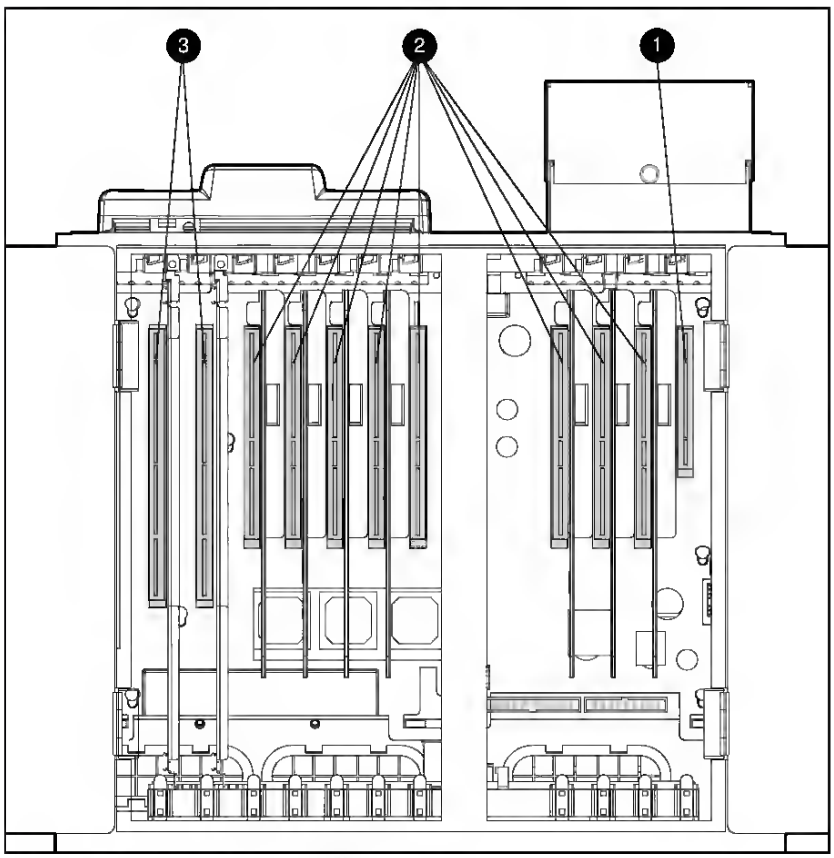

Figure 2-56. Top view of the I/O expansion board slots

Table 2-6
I/O Expansion Board Slots

Item	Description
❶	32-bit PCI Hot Plug (slot 1)
❷	64-bit PCI Hot Plug (slots 2 through 9)
❸	64-bit PCI Hot Plug with Extended SCSI (slots 10 and 11)

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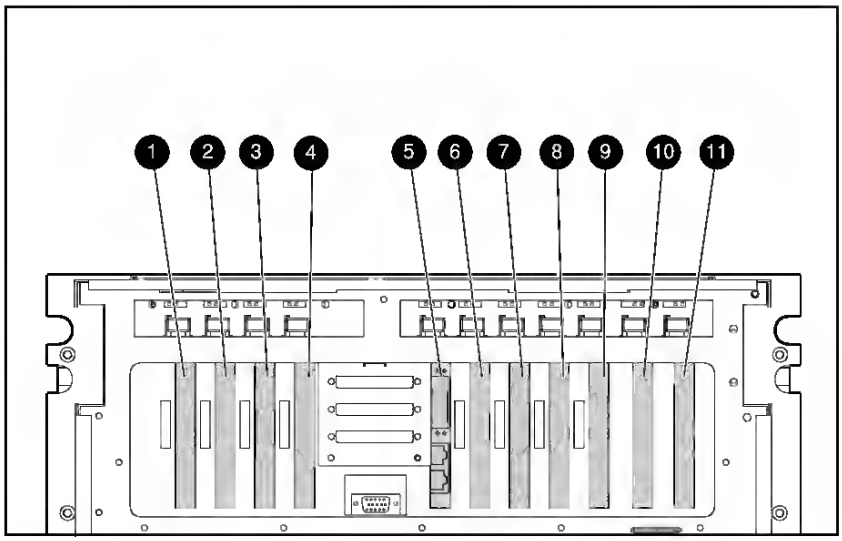

Figure 2-57. Rear view of the I/O expansion board slots

Table 2-7
I/O Expansion Board Slots

Item	Description
❶	32-bit/33-MHz PCI Hot Plug (universal or 5-V keying)
❷, ❸, ❹	32-bit or 64-bit/33-MHz PCI Hot Plug (universal or 5-V keying)
❺	32-bit or 64-bit/33-MHz PCI Hot Plug, NC3131 Fast Ethernet Dual 10/100 NIC
❻, ❼, ❽, ❾	32-bit or 64-bit/33-MHz PCI Hot Plug (universal or 5-V keying)
❿	64-bit/66-MHz hot-plug with Extended SCSI, Smart Array 4250ES Controller or other Extended SCSI controller
⓫	64-bit/66-MHz hot-plug with Extended SCSI

Note: Hot-plug I/O expansion board slots (11 total) can be accessed through the PCI Hot Plug access doors.

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Array Controllers with Extended SCSI

To remove an array controller with Extended SCSI architecture:

1. Unlock then open the PCI Hot Plug access doors. See "I/O Expansion Slots" earlier in this chapter.
2. Deactivate the expansion board slot LED by pressing the square button on the PCI switchboard ❶.

> **CAUTION:** Do not open the slot release lever unless the green PCI Hot Plug LED indicator for the slot is off. System power down and subsequent data loss could occur. Never remove an active controller unless it is in a redundant configuration.

3. When the green LED is off, push down on the slot release lever ❷ then push it back ❸ to free the array controller.
4. Slide the slot keeper ❹ to the open position.

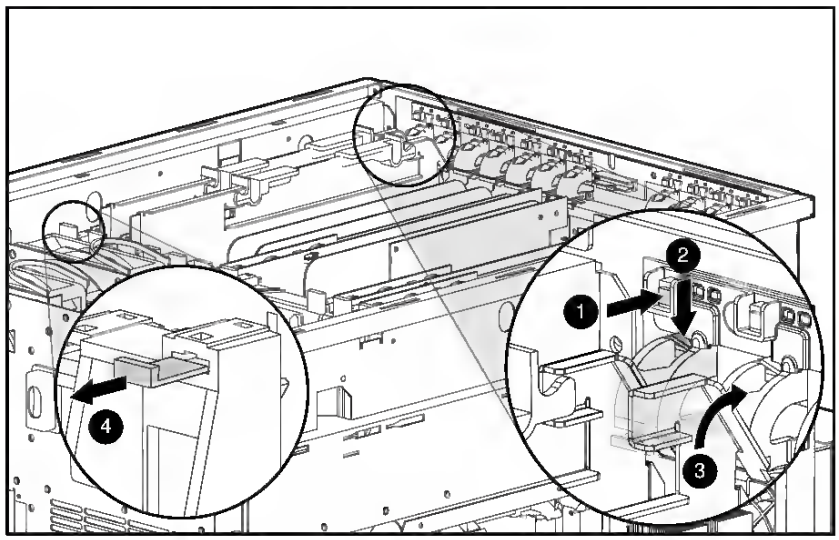

Figure 2-58. Releasing an array controller with Extended SCSI

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5. Pull the ejector levers outward ❺. Then lift the board from the unit ❻.

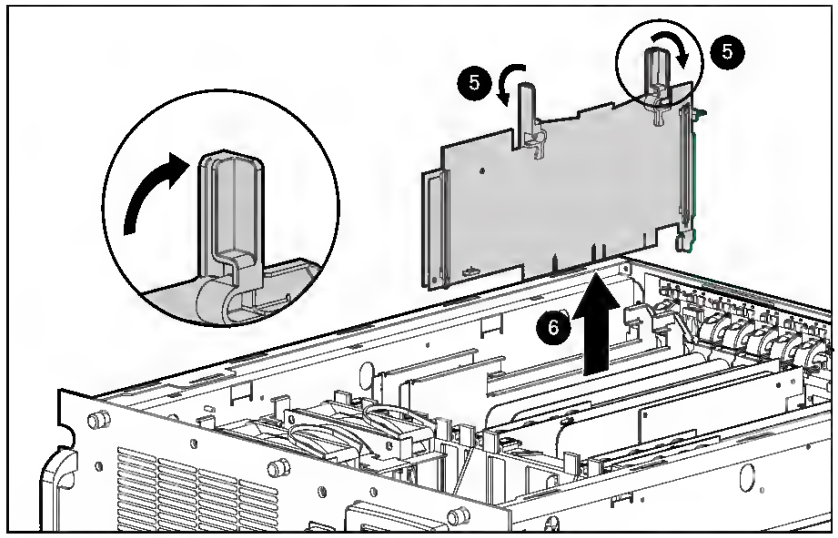

Figure 2-59. Removing an array controller with Extended SCSI

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To replace an array controller with Extended SCSI:

1. Line up the controller with the appropriate slot ❶.
2. Push the controller into the bus slot.

   NOTE: Seat the controller into the slot using the ejector levers to ensure complete board connection.

3. Press the ejector levers inward to lock the long side of the control board into position ❷.
4. Push the slot release lever inward to lock the rear section of the controller into position ❸.

   NOTE: An audible click should occur, indicating that the controller is fully seated.

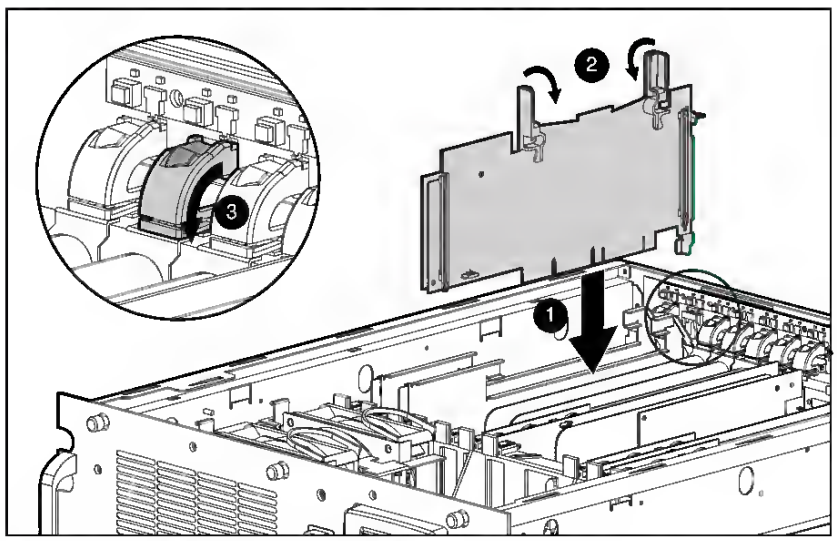

Figure 2-60. Replacing an array controller with Extended SCSI

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Extended SCSI Dividers

Extended SCSI dividers, adjacent to slots 10 and 11, provide leverage for removing and replacing extended SCSI array controllers and add insulation to any PCI board plugged into these slots.

To remove an Extended SCSI divider:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
3. Remove the array controllers with Extended SCSI. See "Array Controllers with Extended SCSI" earlier in this chapter.
4. Pull up the single push-pull fastener ❶.
5. Push in the locking lever on the expansion board guide ❷ and lift the Extended SCSI divider out of the unit ❸.

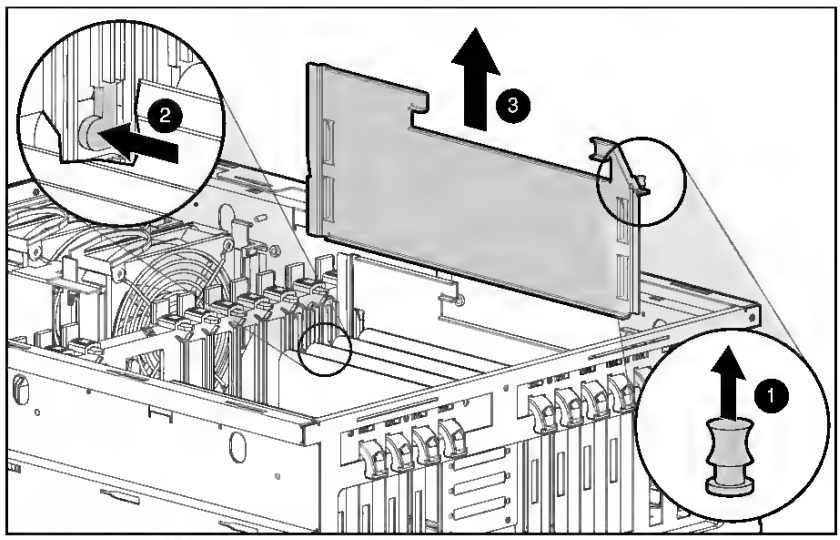

Figure 2-61. Removing an Extended SCSI divider

Reverse steps 1 through 5 to replace an Extended SCSI divider.

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I/O Expansion Boards

This removal and replacement section is for standard I/O expansion boards that are available as options. The board pictured in Figure 2-62 is an Extended SCSI type I/O expansion board.

To remove an I/O expansion board:

1. Unlock and open the PCI Hot Plug access door. See "I/O Expansion Slots" earlier in this chapter.
2. Use the PCI Hot Plug button or software application to turn off power to the slot. The green LED flashes during the power down transition and turns off when system shutdown is complete. For more information refer, to the *Compaq ProLiant 8000 Servers Setup and Installation Guide*.

> **CAUTION:** DO NOT open the slot release lever unless the green PCI Hot Plug LED power indicator for the slot is off. If the lever is opened before power to the slot is turned off, system power down and subsequent data loss could occur. For more information on the power LEDs, refer to Chapter 4, "Connectors, Switches, and Status Indicators."

3. When the green LED for the slot is off, disconnect the cables to the selected PCI expansion board.
4. Push the tab on the slot release lever ❶, then swing the slot release lever back ❷ to unlock the expansion board.
5. Slide the slot keeper to the open position if the expansion board is full length ❸.
6. Disconnect any cables plugged into the selected expansion board.
7. Lift the expansion board through the top of the server ❹.

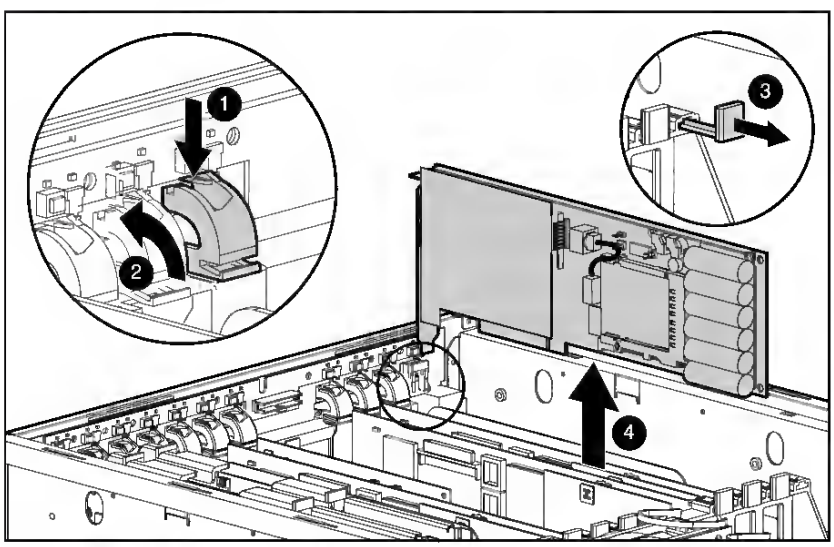

Figure 2-62. Removing an I/O expansion board

Reverse steps 1 through 7 to replace the I/O expansion board.

> **IMPORTANT:** Installing a 33-MHz expansion board into a 66-MHz slot will cause the adjoining expansion slot to run at 33-MHz even if it is populated by a 66-MHz expansion board. Both populated slots will run at the slower 33-MHz rate.

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Cabling Diagrams

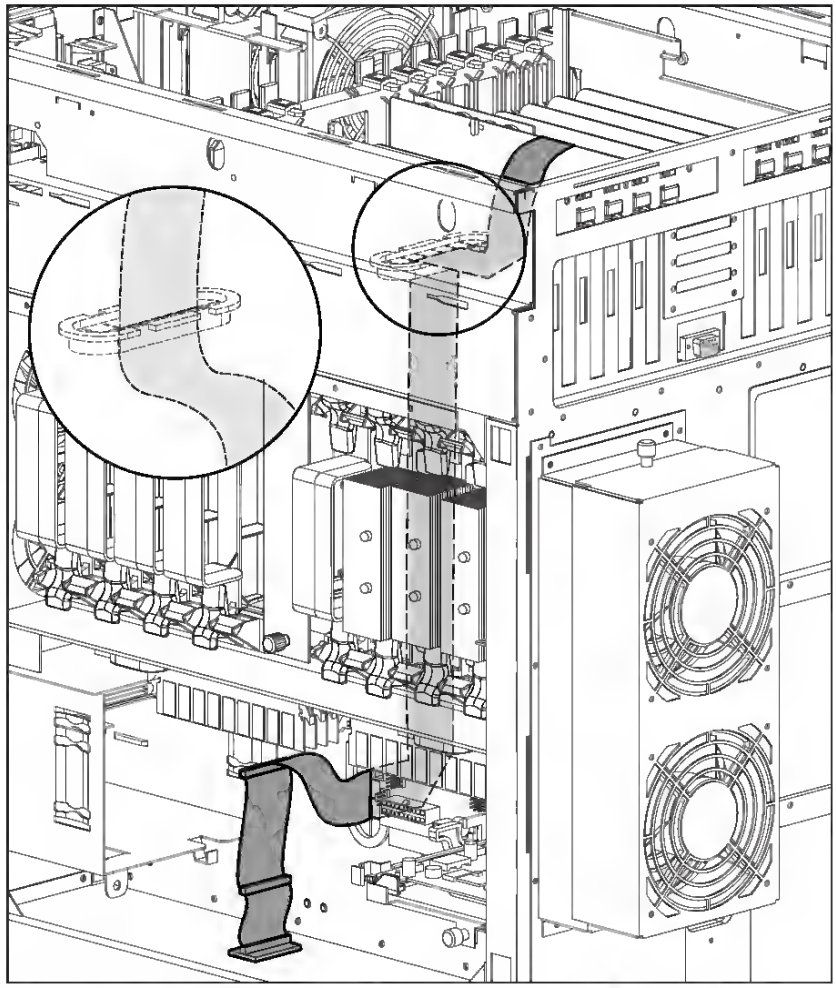

Figure 2-63. Connecting the PCI SCSI controller board to removable media bays (typical)

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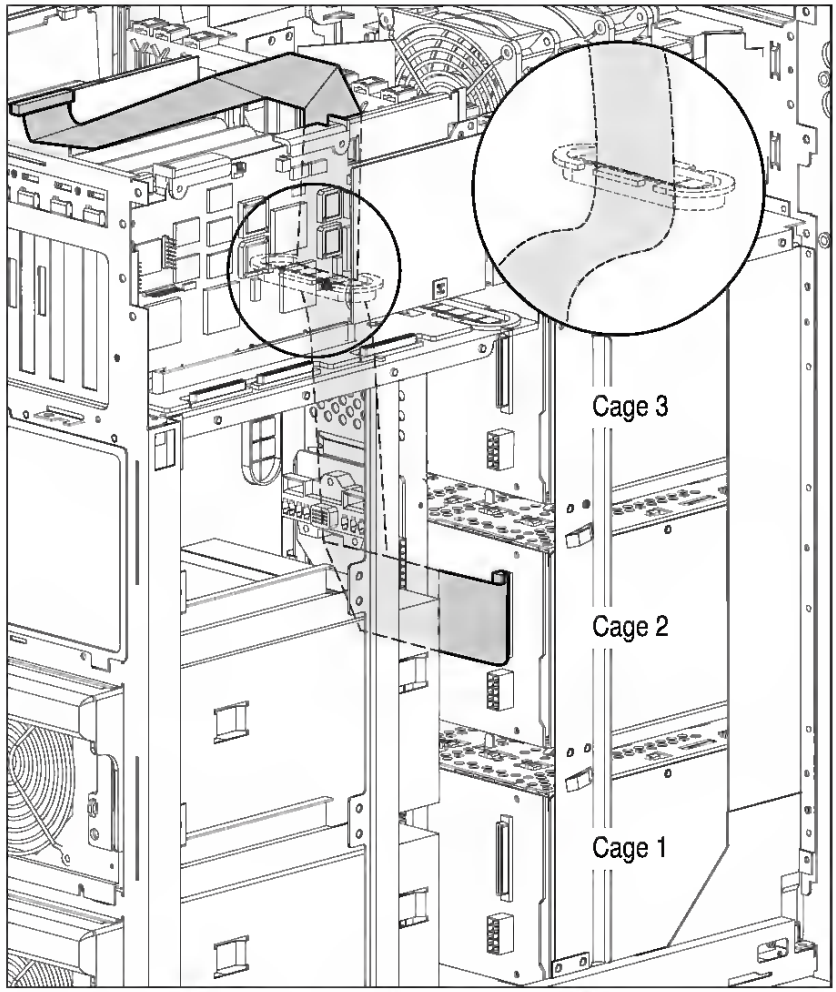

Figure 2-64. Connecting an array controller with Extended SCSI to drive cage 1, 2, or 3

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Hot-Plug Basket Insulator

To remove the hot-plug basket insulator:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
3. Remove the NC3131 Fast Ethernet NIC. See "I/O Expansion Boards" earlier in this chapter.
4. Remove the array controller with Extended SCSI. See "Array Controllers with Extended SCSI" earlier in this chapter.
5. Remove the Extended SCSI dividers. See "Extended SCSI Dividers" earlier in this chapter.
6. Remove any installed I/O expansion boards. See "I/O Expansion Boards" earlier in this chapter.
7. Disconnect cables for the power switch, the PCI Hot-Plug interface, and the fan and speaker.
8. Pull up on the hot-plug basket insulator tab to release the basket ❶. Then move the basket forward to release it from the keyholes.
9. Lift the hot-plug basket insulator out the top of the server ❷.

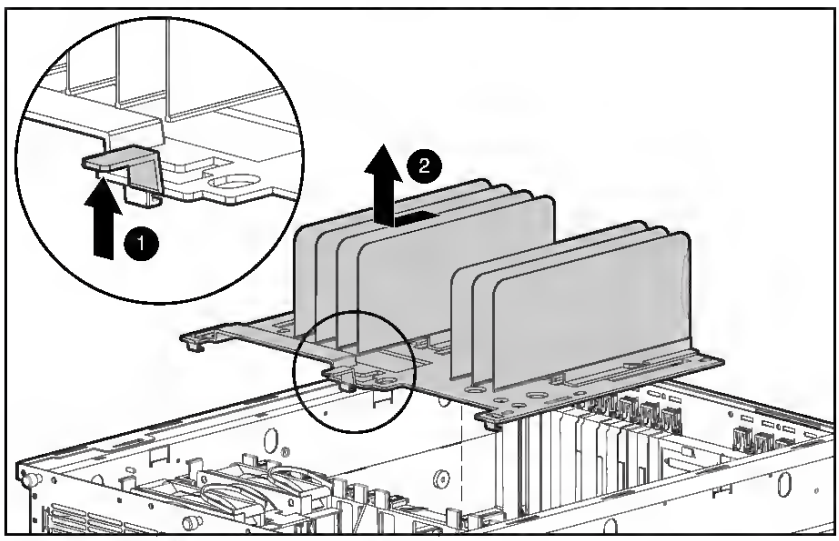

Figure 2-65. Removing the hot-plug basket insulator

Reverse steps 1 through 9 to replace the hot-plug basket insulator.

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Expansion Board Guide

To remove the expansion board guide:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
3. Remove any full-length expansion boards from the expansion board slots. See "I/O Expansion Boards" earlier in this chapter.
4. Remove the cables for the fan, speaker, and power switch from the I/O board.
5. Slide the cables through the expansion board guide.
6. Disconnect the Power On/Standby switch cable from the I/O board.
7. Remove the Extended SCSI dividers. See "Extended SCSI Dividers" earlier in this chapter.
8. Press down on the two release grips on the board guide ❶.
9. Push the expansion board guide firmly toward the rear of the unit. Then lift the board out ❷ of the server.

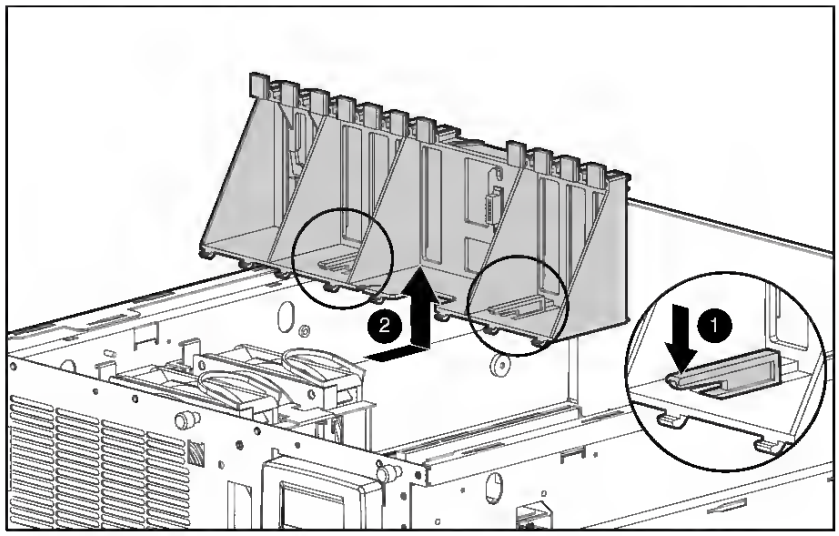

Figure 2-66. Removing the expansion board guide

Reverse steps 1 through 9 to replace the expansion board guide.

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PCI Hot Plug Interface Board

To remove the PCI Hot Plug interface board:

1. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
2. Disconnect the cable securing the interface board to the system board ❶.
3. Remove the extended SCSI dividers. See "Extended SCSI Dividers" earlier in this chapter.
4. Remove all I/O expansion boards. See "I/O Expansion Boards" earlier in this chapter.
5. Open the PCI expansion slot levers.
6. Pull the six push-pull fasteners to release the interface board ❷.
7. Pull the interface board away from the sheet metal ❸.

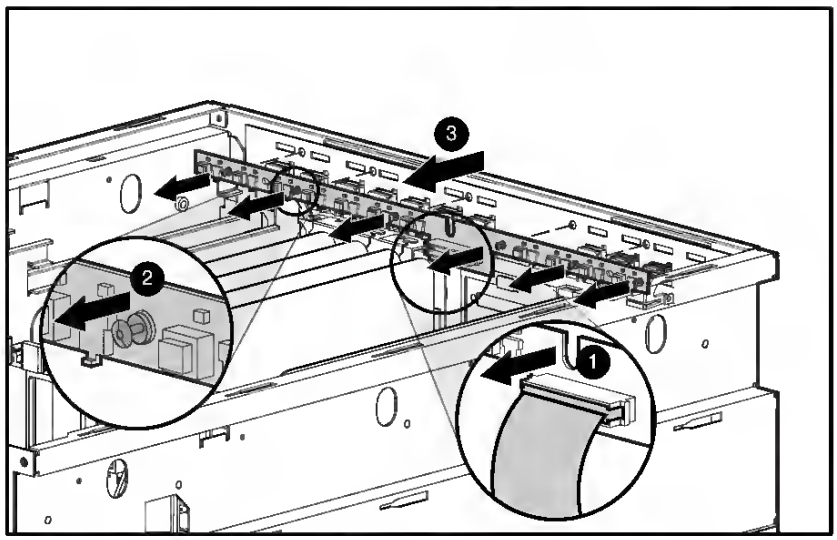

Figure 2-67. Removing the PCI Hot Plug interface board

Reverse steps 1 through 7 to replace the PCI Hot Plug interface board.

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I/O Board

To remove the I/O board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the array controller with Extended SCSI. See "Array Controllers with Extended SCSI" earlier in this chapter.
3. Remove any I/O expansion boards. See "I/O Expansion Boards" earlier in this chapter.
4. Remove the Extended SCSI Dividers. See "Extended SCSI Dividers" earlier in this chapter.
5. Remove the hot-plug basket insulator. See "Hot-Plug Basket Insulator" earlier in this chapter.
6. Disconnect all cables from the I/O board.
7. Loosen the I/O board captive thumbscrews ❶.
8. Lift up on the ejector lever to release the I/O board ❷. Then gently pull up the board ends to release them from the push-pull pins ❸.

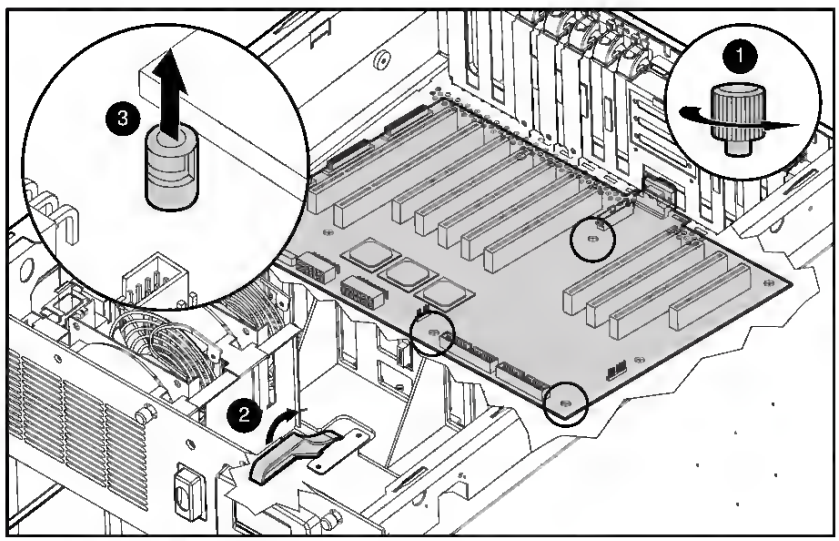

Figure 2-68. Removing the I/O board

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9. Tilt the board from the back of server to clear the video connector ❹.
10. Lift the I/O board through the top of the server ❺.

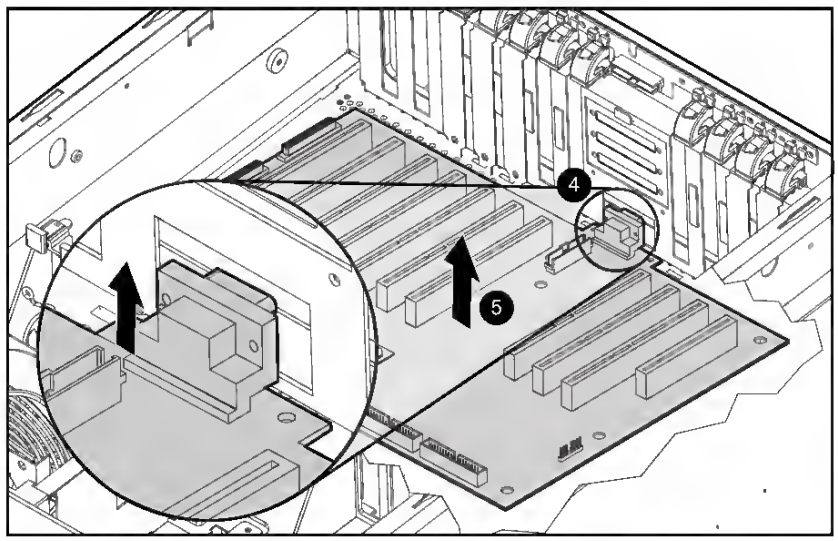

Figure 2-69. Clearing the video connector area of the I/O board

Reverse steps 1 through 10 to replace the I/O board.

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External Battery

CAUTION: Do not remove the lithium battery from the processor board or permanent damage may occur. If the battery fails, use the external battery as a replacement.

CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, use the public collection system or return them to Compaq, your authorized Compaq Partners, or their agents.

To install the external replacement battery:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the right side access panel. See "Right Side Access Panel" earlier in this chapter.
3. Connect the battery cable to battery header E1 on the processor board ❶.

IMPORTANT: Compaq ProLiant 8000 servers provide two external battery headers for replacement batteries. Header E1 provides connection for an external battery if the onboard battery fails. Header E2 provides connection for a second replacement battery, if necessary. Plug the second replacement battery to header E2, attach the second replacement battery to the chassis, then unplug and remove the first replacement battery.

4. Remove the adhesive backing from the hook-and-loop fastener strip.
5. Place the battery and the hook-and-loop fastener strip on the chassis ❷.
6. Change the switch setting on the processor board from INT BATT to EXT BATT ❸.

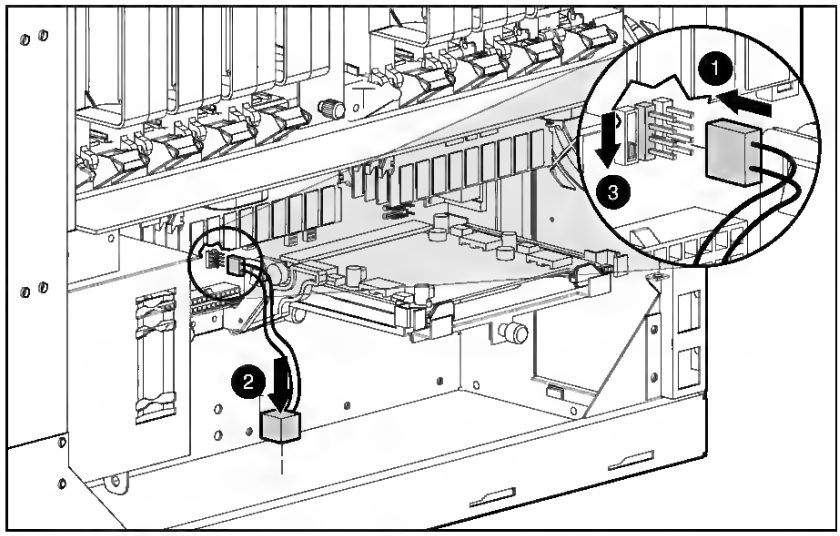

Figure 2-70. Installing the external replacement battery

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7. Place the sticker included with your battery kit on the back of your server above the power connector.

IMPORTANT: You must run the Compaq System Configuration Utility to reconfigure the server after installing a replacement battery.

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Chapter 3

Diagnostics and Troubleshooting

This chapter describes software and firmware diagnostic tools available for all Compaq server products. The sections in this chapter are:

- Diagnostic Tools Utility Overview
- Default Configuration
- Utilities Access
- Power-On Self-Test
- Diagnostics Software
- Array Diagnostic Utility
- Integrated Management Log
- Rapid Error Recovery
- Remote Service Features
- ROMPaq Error Recovery Options
- Compaq Insight Manager

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Diagnostic Tools Utility Overview

These utilities were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing Compaq server hardware.

Table 3-1
Diagnostic Tools

Tool	What it is	How to run it
Compaq Diagnostics Program	Utility to assist testing and/or verifying operation of Compaq hardware. If problems are found, Compaq Diagnostics isolates failure(s) down to replaceable part, whenever possible.	Diagnostics and Utilities are located on the system partition on the hard drive and must be accessed when a system configuration error is detected during Power-On Self-Test (POST). Compaq Diagnostics software is also available on the Compaq SmartStart and Support Software CD. A Diagnostics diskette can be created from SmartStart and Support Software CD.
Compaq Inspect Utility	The Inspect Utility provides a report detailing system information.	The Inspect Utility can be run from either the main menu of the System Configuration Utility or the Compaq Diagnostics program.
Compaq Insight Manager	A client/server application used to remotely manage Compaq hardware in a network environment. Reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information, refer to the Compaq Management CD and the *Compaq Insight Manager User Guide*. More information on viewing and printing the event list can be found in the Compaq Insight Manager section of this chapter.
Compaq Survey Utility	An online information gathering agent that runs on servers, gathering critical hardware and software information from various sources. A utility for servers running Windows NT or NetWare. If a significant change occurs between data gathering intervals, previous information is marked, and the survey text file is overwritten to reflect the latest configuration and changes since last configuration. This allows a historical record of change events for server hardware and software.	Install Survey Utility from the SmartStart and Support Software CD, Compaq Integration Maintenance Utility, or from Compaq Management CD.

continued

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Table 3-1
Diagnostic Tools *continued*

Tool	What it is	How to run it
Array Diagnostics Utility (ADU)	A Windows-based tool designed to run on all Compaq systems that support Compaq array controllers. Two main functions of ADU are to collect all possible information about the array controllers in the system and to generate a list of detected problems. This tool is available for all Compaq servers covered by this guide.	Use the information provided in Array Diagnostics Utility (ADU) later in this chapter.
Drive Array Advanced Diagnostics (DAAD)	The predecessor to ADU, DAAD is a DOS-based tool for Compaq servers with Smart Array Controllers. DAAD collects information about the array controllers in the system and offers a list of detected problems.	For a list of Compaq servers still supported by this tool, visit the Compaq website: http://www.compaq.com
Integrated Management Log	A log of system events, such as system failures or nonfatal error conditions. View events in the Integrated Management Log: ■ On the Integrated Management Display ■ From within Compaq Insight Manager ■ From within Compaq Survey Utility	The Integrated Management Log requires Compaq operating system-dependent drivers. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers.
System Configuration Utility	A utility to easily configure the hardware installed in or connected to the server. Specifically, it can: ■ Resolve resource conflicts in areas such as memory, port addresses, and interrupts (IROs) ■ Configure PCI boards automatically ■ Provide switch and jumper settings ■ Manage installation of memory, processor upgrades, and mass storage devices such as hard drives, tape drives, and diskette drives ■ Store configuration information in nonvolatile memory ■ Assist in installation of an operating system ■ Assist in running diagnostic tools such as TEST and INSPECT	If the server has bootable CD-ROM drive, run Compaq System Configuration Utility directly from Support Software CD supplied with the Smart Controller Option Kit, or SmartStart and Support Software CD supplied with server. Use the CD supplied for latest version supporting SMART Controller. If the server does not have a bootable CD-ROM drive, create diskettes with latest version of the System Configuration Utility from Support Software CD, or SmartStart and Support Software CD.

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Default Configuration

When the system is first turned on, the system ROM detects the unconfigured state of the hardware and provides default configuration settings for most devices. By providing this initialization, the system can run Diagnostics and other software applications before running the normal SmartStart and System Configuration programs.

Default Configuration Messages

IMPORTANT: Formatting and partitioning the boot drive before running SmartStart and the System Configuration programs may prohibit creating a System Partition and the off-line remote management features that it provides.

If you insert a System Configuration, Diagnostics, or SmartStart and Support Software CD into the CD-ROM drive before powering up the server, the system ROM boots to that utility. If the system ROM does not detect one of those CDs, you will be prompted to identify the intended operating system. The system reboots if any operating system-dependent configurations have changed with the new operating system selection. If the selected operating system-dependent configurations are the same as the current configurations, the system boots normally. If you enter a wrong choice, on subsequent reboots you can change the operating system.

Inspect Utility

The Inspect Utility provides configuration information such as the contents of the operating system startup files, the current memory configuration, the ROM version, and Integrated Management Log information. It operates with MS-DOS and in the MS-DOS emulation mode of OS/2.

Running the Inspect Utility

1. Turn off the server and then turn it back on and press **F10** when the cursor appears in the upper right corner of the screen.
2. At the main menu, select Diagnostics and Utilities.
3. Press **Enter**.
4. Select Inspect Computer and press **Enter**.

   NOTE: If Diagnostics is not installed on the hard drive, the System Configuration Utility prompts you to insert the Diagnostics diskette into drive A.

5. Follow the instructions. The first time the Inspect Utility displays, select Entire System and press **Enter**.

Printing the Inspect Listing

Select Print on the Inspect screen to print a copy of the Inspect listing. Keep a copy of the listing with each server for later reference.

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Utilities Access

The Compaq SmartStart and Support Software CD contains the SmartStart program and many of the Compaq utilities needed to maintain the system, including:

- System Configuration Utility
- Array Configuration Utility
- Array Diagnostic Utility
- ROMPaq Firmware Upgrade Utilities
- Compaq Diagnostics

CAUTION: Do not select the Erase Utility when running the SmartStart and Support Software CD. This will result in data loss to the entire system.

Running Compaq Utilities

Compaq Utilities can be run from the system partition, from diskette, or from the Compaq SmartStart and Support Software CD.

Running the Utilities from the System Partition

If the system partition was installed using SmartStart, the Compaq utilities will automatically be available on the system partition. The system partition could also have been created during a manual system installation.

To run the utilities on the system partition, start the system and press **F10** when you see:

Press F10 for system partition utilities.

Then select the desired utility from the menu:

- The System Configuration Utility is available under the System Configuration menu.
- The Array Configuration Utility is available under the System Configuration menu.
- Compaq Diagnostics (Test and Inspect) are available under the Diagnostics and Utilities menu.
- The ROMPaq Firmware Upgrade Utility is available under the Diagnostics and Utilities menu.

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Running the Utilities from Diskette

Run the utilities from their individual diskettes. If you have a utility diskette newer than the version on the SmartStart and Support Software CD, use that diskette.

Create a diskette version of the utility from the SmartStart and Support Software CD.

To create diskette versions of the utilities from the CD:

1. Boot the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select Create Support Software Disks, then Next.
3. Select the diskette you would like to create from the list, then follow the instructions on the screen.

Running the Utilities from the Compaq SmartStart and Support Software CD

IMPORTANT: Only the System Configuration Utility, Array Configuration Utility, and Array Diagnostic Utility can be executed from the Compaq SmartStart and Support Software CD. All other utilities must be executed from the system partition or from diskette.

To run these utilities directly from the Compaq SmartStart and Support Software CD:

1. Boot the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select the utility to run, then select Next.
   - To execute the System Configuration Utility, select Run System Configuration Utility
   - To execute the Array Configuration Utility, select Run Array Configuration Utility.
   - To execute the Array Diagnostic Utility, select Run Array Diagnostic Utility.

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Power-On Self-Test

The Power-On Self-Test (POST) is a series of diagnostic tests that run automatically on Compaq computers when the system is turned on. POST checks the following assemblies to ensure that the computer system is functioning properly:

- System ROM
- Keyboard
- System board
- Memory
- Memory expansion boards
- Controllers
- Diskette drives
- Hard drives
- Processor Power Modules
- Fans

POST Error Messages

If POST finds an error in the system, the error condition is indicated by an audible or visual message. If an error code displays on the screen during POST or after resetting the system, use the instructions in the POST Error Messages table.

NOTE: Many of the actions listed require you to run Diagnostics or the Compaq System Configuration Utility. Steps for running these utilities are provided following the POST Error Messages tables.

The Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the error condition has been corrected. If the error code reappears:

1. Perform the next step listed in the table.
2. Then run the Diagnostics program again.
3. Follow this procedure until Diagnostics no longer detects an error condition.

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Table 3-2
POST Error Messages

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
A Correctable Memory Error occurred prior to this power-up	None	A memory module has experienced an error which, while recoverable, has generated a predictive failure warning.	Run Compaq Diagnostics to identify and replace the appropriate memory module.
A Critical Error occurred prior to this power-up	None	A catastrophic system error, which caused the server to crash, has been logged.	Run Diagnostics. Replace failed assembly as indicated.
Beeps only	2 long	No valid memory is present in the system.	1. If no memory modules are present, install at least one memory module to conform to minimum hardware configuration specifications. 2. Reseat all installed memory modules. 3. If the system contains more than one memory module, remove one module, and restart the server. Repeat as needed to isolate the bad memory module.
Beeps only	2 long, 2 short	The power has cycled because the temperature is too hot. The processor fan is not installed, or is not spinning.	Check fans.
Critical Fan Failure Detected – System Shutting Down System Halted	None	A critical fan is not spinning.	1. Check fans. 2. Check fan cable connections.
ECC Multiple Bit Error Detected in DIMM:	None	A memory module failure generated a multiple bit error that could not be corrected.	Run Compaq Diagnostics and replace failed memory module as indicated.
FATAL ROM ERROR: The System ROM is not properly programmed	1 long, 1 short	The System ROM is not properly programmed.	Flash the ROM as explained in the troubleshooting guide or call a Compaq authorized service provider.
Initialization failure Re-seat the processor and Processor Power Module before attempting replacement	None	Processor was not fully seated. A processor internal failure occurred.	1. Reseat the processor. 2. Replace the processor if the failure recurs.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
Invalid electronic serial number	None	Serial number in BIOS is incorrect.	Run the System Configuration Utility to program serial number.
No SCSI Devices Detected	None	No SCSI devices are connected to the boot controller	Verify configuration. Check SCSI cable, attached drives, and SCSI IDs.
Non-System disk or disk error	None	No bootable disk partition was found on the boot drive	1. Remove diskette from diskette drive. 2. Check controller order in System Configuration Utility. 3. Check boot order in System Configuration Utility. 4. Reinstall operating system.
Parity Check 2	None	A PCI device generated a parity error 2.	Remove recently added PCI adapters. Re-add the adapters one at a time to determine which is generating errors. Replace the failed device.
(RESUME – F1 key)	None	As indicated to continue	Press **F1.**
(Run System Configuration Utility – F10 key)	None	A configuration error occurred during POST	Press **F10** to run System Configuration Utility.
Unsupported Processor Detected System Halted	1 long, 1 short	Processor not supported by current system ROM.	Check documentation for supported processors, and if supported, remove the processor and update the system to latest ROM.
101-ROM Error	1 long, 1 short	System ROM checksum.	Run Compaq Diagnostics. Replace failed assembly as indicated.
101-I/O ROM Error	None	Options ROM checksum.	Run Compaq Diagnostics. Replace failed assembly as indicated.
102-System Board Failure	None	8237 DMA controllers, 8254 timers, and so on	Replace the system board. Run the System Configuration Utility.
104-ASR-2 Timer Failure	None	System board failure.	Run Compaq Diagnostics. Replace failed assembly as indicated.
105-Current System ROM is corrupt – now booting redundant System ROM	2 long	Nonbooted ROM image is corrupt.	Flash the ROM utilizing ROMPaq. Refer to the ROMPaq Disaster Recovery section of this guide.
162-System Options Not Set	2 short	Configuration incorrect.	Run the System Configuration Utility and correct.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
163-Time & Date Not Set	2 short	Invalid time or date in configuration memory.	Run the System Configuration Utility and correct.
164-Memory Size Error	2 short	Configuration memory incorrect.	Run the System Configuration Utility and correct.
172-Configuration Nonvolatile Memory Invalid	None	Nonvolatile configuration corrupted.	Run the System Configuration Utility and correct.
173-Slot ID Mismatch	None	Board replaced, configuration not updated.	Run the System Configuration Utility and correct.
174-Configuration/ Slot Mismatch Device Not Found	None	EISA or PCI board not found.	Run the System Configuration Utility and correct.
175-Configuration/ Slot Mismatch Device Found	None	EISA or PCI board added, configuration not updated.	Run the System Configuration Utility and correct.
177-Configuration Not Complete	None	Incomplete system configuration detected.	Run the System Configuration Utility and correct.
178-Processor Configuration Invalid	None	Processor type or step does not match configuration memory.	Run the System Configuration Utility and correct.
180-Log Reinitialized	None	The Integrated Management Log has been reinitialized, probably due to corruption of the log.	Event message, none needed.
201-Memory Error	None	RAM failure detected.	Run Compaq Diagnostics. Replace failed assembly as indicated.
202-Memory Type Mismatch	2 short	An incompatible memory module is installed in the system.	Compare Compaq part numbers from installed memory modules with the manual. If not listed, the memory modules are incompatible and should be replaced or removed.
203-Memory Address Error	None	RAM failure.	Run Compaq Diagnostics. Replace failed assembly as indicated.
207-ECC Corrected Single Bit Errors in DIMM in Memory Module Socket	None	Memory module is malfunctioning.	Run Compaq Diagnostics. Replace or remove malfunctioning memory module as indicated.
207-Invalid Memory Configuration – Check DIMM Installation	None	Memory module installed incorrectly.	Verify placement of memory modules.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
208-Invalid Memory Speed - Check DIMM Installation	1 long, 1 short	The speed of the memory is not compatible	Verify the speed of the memory modules installed, then check your server user documentation and replace as indicated.
209-Memory Detection Failure. Check Memory Installation	1 long, 1 short	Unable to size memory	Check memory module installation. If error persists, call Compaq service provider.
211-Invalid Voltage Regulator Module installed for Processor *X*	None	Non-redundant Processor Power Module (PPM) installed in indicated processor slot	Replace with a PPM that supports redundancy.
212-System Processor Failed/ Mapped out	1 short	Processor in slot x failed	Run Compaq Diagnostics and replace failed processor.
214-DC-DC Converter Failed	None	Processor Power Module (PPM) failed	Run Compaq Diagnostics. Replace failed assembly as indicated.
214-Memory Device Failure Error Code X Memory Module DIMM Y	None	A memory module failed	Run Compaq Diagnostics. Replace failed memory module as indicated
214-Processor PPM Failed, Module *X*	None	Indicated Processor Power Module (PPM) failed.	Replace failed assembly as indicated.
215-Nonfunctioning Voltage Regulator Module for Processors	None	PPM (DC-DC Converter) failed or lost redundancy.	Run Compaq Diagnostics. Replace failed assembly as indicated.
216-Voltage Regulator Module for Processor X no longer redundant	None	Redundancy failed in PPM.	To restore redundancy, replace the PPM
216-Processor PPM has lost Redundancy, Module X	None	Indicated PPM has lost redundancy	Replace failed assembly as indicated.
218-Cache Accelerators Not Installed. System Halted.	None	Cache accelerators not installed or improperly installed.	Check cache accelerator installation.
219-Tag Update Rules SRAM Failure. System Halted	None	Catastrophic chipset failure occurred	Call Compaq authorized service provider.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
219-Snoop Rules SRAM Failure. System Halted.	None	Catastrophic chipset failure occurred	Call Compaq authorized service provider.
220-Cache Accelerator Slot x Initialization Failed. System Halted.	None	Cache accelerator in slot x improperly installed or bad	Check cache accelerator installation and if properly installed, replace.
221-Power Fault On Processor Bus X	None	A PPM on indicated bus is in a failed state	Run Compaq Diagnostics. Replace failed assembly as indicated.
301-Keyboard Error	None	Keyboard failure occurred	Turn off the computer, then reconnect the keyboard.
301-Keyboard Error or Test Fixture Installed	None	Keyboard failure occurred.	Replace the keyboard.
ZZ-301-Keyboard Error	None	Keyboard failure occurred. (*ZZ* represents the Keyboard Scan Code.)	1. A key is stuck. Try to free it. 2. Replace the keyboard.
303-Keyboard Controller Error	None	System board, keyboard, or mouse controller failure occurred	1. Run Diagnostics. 2. Replace failed assembly as indicated.
304-Keyboard or System Unit Error	None	Keyboard, keyboard cable, or system board failure	1. Make sure the keyboard is attached. 2. Run Diagnostics to determine which is in error. 3. Replace the part indicated.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
40X-Parallel Port X Address Assignment Conflict	2 short	Both external and internal ports are assigned to parallel port X.	Run the System Configuration Utility and correct.
404-Parallel Port Address Conflict Detected A hardware conflict in your system is keeping some system components from working correctly. If you have recently added new hardware remove it to see if it is the cause of the conflict. Alternatively, use Computer Setup or your operating system to insure that no conflicts exist.	2 short	A hardware conflict in your system is preventing the parallel port from working correctly.	1. If you have recently added new hardware, remove it to see if the hardware is the cause of the conflict. 2. Run your System Configuration Utility to reassign resources for the parallel port and manually resolve the resource conflict. 3. Run Compaq Diagnostics to resolve the issue.
601-Diskette Controller Error	None	Diskette controller circuitry failure occurred.	1. Make sure the diskette drive cables are attached. 2. Replace the diskette drive and/or cable. 3. Replace the system board.
602-Diskette Boot Record Error	None	The boot sector on the boot disk is corrupt.	1. Remove diskette from the diskette drive. 2. Replace diskette in drive. 3. Reformat diskette.
605-Diskette Drive Type Error	2 short	Mismatch in drive type occurred.	Run the System Configuration Utility to set diskette type correctly.
611-Primary Floppy Port Address Assignment Conflict	2 short	A hardware conflict in your system is preventing the diskette drive from operating properly.	1. Run your System Configuration Utility to configure the diskette drive port address and manually resolve the conflict. 2. Run Compaq Diagnostics and replace failed assembly as indicated.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
800-Server Feature Board must be installed in slot 1 for proper operation	None	The system has detected the absence of the Server Feature Board. The Server Feature Board is not installed in the proper slot. The Server Feature Board does not match this system.	1. Install the Server Feature Board in PCI slot 1. 2. Reseat the Server Feature Board. 3. Verify that the Server Feature Board is from this system.
801-Server Feature Board is not properly cabled to the system. Verify that the server management information cable from the system board to the Server Feature Board in slot 1 is intact and fully seated at both ends	None	The system has detected that the server management information cable is not properly installed.	1. Check to make sure that a server management information cable is installed in the system. 2. Inspect the server management information cable for signs of damage. 3. Reseat the server management information cable on the system board and on the Server Feature Board.
802-Processor *X* is missing or terminator board is not present. System Halted	None	The system detected that the indicated processor slot is empty.	1. Verify that a processor or processor terminator card is installed in each processor slot. 2. Reseat the processor or processor terminator card in each processor slot. 3. Verify that each processor has a corresponding Processor Power Module installed. 4. Try replacing each processor with a processor terminator card to detect a failed processor or Processor Power Module

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
803-Processor speeds must match for system operation. System Halted	None	Two processors with different speed ratings are installed in the system. All installed processors must have the same speed rating for safe operation.	1. Replace one of the processors with a processor terminator card. 2. Replace one of the processors with an alternate processor rated for the same operating speed as the installed processor.
804-100MHz memory is incompatible. System Halted	None	A memory module other than 133-MHz ECC registered SDRAM DIMM has been detected.	1. Reseat all memory modules in the system. 2. Remove incompatible memory modules. 3. Sequentially try each memory module individually in DIMM slot 1 to identify the incompatible memory module.
805-The bootstrap processor is not the lowest stepping processor in the system. This is unsupported configuration. Swap the position of the processors on the system board to correct this issue	None	The system has detected that the processors in the system are not the same stepping and that the processor in processor slot 1 has a lower stepping than the processor in processor slot 2. The processor in processor slot 2 must have the same or lower stepping than the processor in processor slot 1. (Processor stepping is a designation that reflects the processor generation.)	Perform the following four steps: 1. Remove the processor from processor slot 1. 2. Remove the processor from processor slot 2. 3. Install the processor from processor slot 1 into processor slot 2. 4. Install the remaining processor in the available processor slot

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
806-NVRAM has been reset Please power off the system and restore SW1.2 to the default position. Run BIOS Setup to set default values. System Halted.	None	The system configuration switch (SW1), position 2 has been turned on and the system configuration data has been cleared from CMOS. This switch must be returned to the default off position for normal operation and the ability to save configuration setup data. The system must be reconfigured.	1. Remove power from the system. 2. Locate the system configuration switch (SW1). Refer to the user documentation for instructions. 3. Return position 2 to the off position. 4. Restart the system. 5. Press **F10** to run the System Configuration Utility and configure the system. 6. Select the primary operating system. 7. Set the date and time. 8. Complete additional configuration as needed.
807-The Setup password is cleared. Please power off and restore the clear password switch (SW1.1)	None	The system board configuration switch SW1.1 has been turned on and the system configuration password has been cleared. SW1.1 must be returned to the default off position for normal operation and the ability to set a password with the System Configuration Utility.	1. Remove power from the system. 2. Locate the System Board Configuration Switch. 3. Return SW1.1 to the off position. Restart the system. 4. Press **F10** and use the System Configuration Utility to set a new password.
1151-Com Port 1 Address Assignment Conflict	2 short	Both external and internal serial ports are assigned to COM1.	Run the System Configuration Utility and correct.
1151-Serial Port A Address Conflict Detected	2 short	A hardware conflict is preventing the normal operation of a serial port.	Run the System Configuration Utility to reassign the serial port address and manually resolve the conflict.
1152-Com Port 2, 3, or 4 Address Assignment Conflict	2 short	Both external and internal serial ports are assigned to COM2, COM3 or COM4.	Run the System Configuration Utility and correct.
1152-Serial Port B Address Conflict Detected	2 short	A hardware conflict is preventing the normal operation of a serial port.	Run the System Configuration Utility to reassign the serial port address and manually resolve the conflict.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1155-Serial Port Address Conflict Detected	2 short	A hardware conflict is preventing the normal operation of a serial port.	Run the System Configuration Utility to reassign the serial port address and manually resolve the conflict.
1610-Temperature violation detected. Waiting for system to cool	2 short	Ambient system temperature too hot	Check fan in system environment.
1611-Fan failure detected	None	Required fan not installed or spinning.	Check fans. Reseat fan cable. Replace fan.
1611-CPU Fan not present	None	Required fan not installed.	Check fans. Reseat fan cable. Install missing fan.
1611-CPU Fan (Fan X) failure detected	2 short	CPU fan has failed.	Replace the failed CPU fan.
1611-Fan failure detected	2 short	Required fan not installed or spinning.	Check fans.
1611-I/O Fan failure detected	None	Required fan not spinning.	Check fans. Reseat fan cable. Replace fan.
1611-I/O Fan not present	None	Required fan not installed.	Check fans. Reseat fan cable. Install missing fan.
1611-I/O Fan (Fan X) failure detected	2 short	I/O fan has failed.	Replace the failed I/O fan.
1611-System Fan failure detected	None	Required fan not spinning.	Check fans. Reseat fan cable. Replace fan.
1611-System Fan not present	None	Required fan not installed.	Check fans. Reseat fan cable. Install missing fan.
1612-Primary power supply failure	2 short	Primary power supply has failed	Replace power supply as soon as possible.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1613-Low System Battery	None	Real time clock system battery is running low on power.	Replace battery (or add external battery) as soon as possible.
1615-Power Supply configuration error	None	Your configuration requires an additional power supply. A moving bar will display, to indicate that the system is waiting for another power supply to be installed.	Install the additional power supply.
1615-Power Supply Failure, Power Supply Unplugged, or Power Supply Fan Failure in Bay X	None	A power supply has failed.	Reseat power supply firmly. -Or- Replace power supply as soon as possible.
1617-Fan controller not responding. System halted.	2 short	Fan controller failure detected.	Check and replace failed controller assembly.
1617-I/O Fan controller not responding. System halted	2 short	I/O fan controller failure detected.	Check and replace failed controller assembly.
1617-CPU Fan controller not responding. System halted	2 short	CPU fan controller failure detected.	Check and replace failed controller assembly.
1618-PCI slots powered down. Check PCI hot plug enabler connectors.	None	PCI hot plug enabler is missing or failed.	Check and replace missing or failed assembly.
1620-Locked SCSI Bus Detected. Verify SCSI bus cabling. System halted.	None	SCSI bus failure detected.	Ensure that the integrated SCSI controller has SCSI termination attached.
1621-Current SCSI bus cable configuration is not recommended	None	Improper SCSI bus cabling detected.	Check documentation for proper SCSI bus cabling.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1622-Internal SCSI Jumper Board Not Installed	None	The system has detected that the array enabler board is not installed.	Install the array enabler board.
1701-SCSI Controller Failure	None	Embedded SCSI controller has failed or an attached device is preventing normal operation.	1. Check SCSI cables and verify they are fully seated. 2. Verify SCSI IDs are assigned correctly at each SCSI device. 3. Remove SCSI cables from the controller and observe if the failure still occurs. If necessary, replace the cables. 4. Run Compaq Diagnostics. 5. Remove individual SCSI devices from the cable to identify a suspect device. 6. Replace failed assembly.
1702-SCSI cable error detected	None	SCSI cable has failed.	1. Reseat the SCSI cable on the controller and all attached devices. 2. Check the SCSI cable at all connectors for bent pins. 3. Replace SCSI cable.
1720-Slot X Drive Array – SMART Hard Drive(s) Detect Imminent Failure SCSI Port Y: SCSI ID X	None	Hard drive predictive failure condition detected.	The indicated drive has reported a SMART predictive failure condition. It may fail at some time in the future. If this drive is part of a non-fault-tolerant configuration, back up all data before replacing the drive and restore all data afterward. If this drive is part of a fault-tolerant configuration, do not replace this drive unless all other drives in the array are online. Press **F1** key to resume.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1721-Slot *X* Drive Array – Drive parameter tracking predicts imminent failure. The following devices should be replaced when conditions permit. Do not replace drive unless all other drives in the array are on-line! Back up data before replacing drive(s) if using RAID 0	None	Monitor and Performance threshold exceeded condition	Replace the drive when it is reasonable for you to do so. The drive has not failed, but Compaq recommends you replace the drive.
1721- SMART SCSI Hard Drive detects imminent failure	None	Indicated drive has reported a SMART predictive-failure condition and may fail at some time in the future.	If this drive is part of a non-fault-tolerant configuration, back up all data before replacing the drive, and restore all data afterward. -Or- If this drive is part of a fault-tolerant configuration, do not replace this drive unless all other drives in the array are online. Press **F1** key to resume.
1724-Slot x Drive Array – Physical Drive Position Change(s) Detected – Logical drive configuration has automatically been updated. RESUME=F1 KEY	None	Drive change detected.	This message indicates that logical drive configuration has been updated automatically following physical drive position changes. Press **F1** key to resume.
1726-Slot *X* Drive Array – Array Accelerator Memory Size Change Detected. – Array Accelerator configuration has automatically been updated.	None	Configuration updated.	This message indicates that the array accelerator configuration has been updated automatically due to replacement of the array accelerator (or controller), with one having different cache memory size. Press **F1** key to resume.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1727-Slot x Drive Array – New Logical Drive(s) Attachment Detected. If more than 32 logical drives, this message will be followed by: Auto-configuration failed: Too many logical drives.	None	Additional drives detected	This message indicates that the controller has detected an additional array of drives that was attached when the power was off. The logical drive configuration information has been updated to add the new logical drives. The maximum number of logical drives supported is 32. Additional logical drives will not be added to the configuration. Press **F1** key to resume.
1729-Slot 1 Drive Array – Disk Consistency Initialization in Progress – RAID 4/5 performance may be lower until Auto Reliability Monitoring has completed Automatic Background Parity Consistency Initialization	None	Initial RAID configuration in progress.	This message is normal following the initial configuration of RAID 4 or RAID 5 logical drives. Performance of the controller will improve after the parity data has been initialized by ARM (an automatic process that runs in the background on the controller).
1730-Fixed Disk 0 does not support DMA Mode	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1731-Fixed Disk 1 does not support DMA Mode	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1740-Fixed Disk 0 failed Set Block Mode command	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1741-Fixed Disk 1 failed Set Block Mode command	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1750-Fixed Disk 0 failed Identity command	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1751-Fixed Disk 1 failed Identify command	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1752-Slot X Drive Array – This controller is not supported in systems with more than 3 GB of memory. The array controller will be disabled. (RESUME = F1 KEY)	None	The array controller cannot access physical system memory above the 3 GB address range.	Remove the array controller and replace with a version that will address memory in the required range.
1760-Fixed Disk 0 does not support Block Mode	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1761-Fixed Disk 1 does not support Block Mode	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1764-Slot X Drive Array – Capacity Expansion Process is temporarily disabled (followed by one of the following) Expansion will resume when Array Accelerator has been reattached. Expansion will resume when Array Accelerator has been replaced. Expansion will resume when Array Accelerator RAM allocation is successful. Expansion will resume when Array Accelerator battery reaches full charge. Expansion will resume when automatic data recovery has been completed.			Reattach or replace array accelerator, wait until the array accelerator batteries have charged, or for Automatic Data Recovery to complete, as indicated.
1765-Slot X Drive Array Option ROM Appears to Conflict With an ISA Card. ISA cards with 16-bit memory cannot be configured in memory range C0000 to DFFFF along with the SMART-2/E 8-bit Option ROM due to EISA bus limitations. Please remove or reconfigure the ISA card			1. Remove or reconfigure conflicting ISA cards. 2. Disable "shared memory" on any ISA network cards that may be installed.
1766-Slot x Drive Array requires System ROM Upgrade. Run Systems ROMPaq Utility.			Run the latest Systems ROMPaq Utility to upgrade the System ROM as indicated.
1767-Slot x Drive Array Option ROM is Not Programmed Correctly or may Conflict with the Memory Address Range of an ISA Card. Check the Memory Address Configuration of installed ISA Card(s) or run Options ROMPaq Utility to attempt SMART-2/E Option ROM Reprogramming.			Remove or reconfigure conflicting ISA cards, especially any cards that are not recognized by the System Configuration Utility. Try reprogramming the ROM on the SMART-2/E Controller using the latest Options ROMPaq (version 2.29 or higher).

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1768-Slot x Drive Array-Resuming logical drive expansion process.	None	SMART-2 Controller error detected.	No action required. Appears whenever a controller reset or power cycle occurs while array expansion is in progress
1769-Slot x Drive Array - Drive(s) disabled due to failure during expand. Select **F1** to continue with logical drives disabled. Select **F2** to accept data loss and to re-enable logical drives.	None	SMART-2 Controller error detected.	Data has been lost while expanding the array; therefore, the drives have been temporarily disabled. Press **F2** to accept the data loss and reenable the logical drives Restore data from backup.
1770-Slot *X* Drive Array – Critical Drive Firmware Problem Detected – Please upgrade firmware on the following drive(s) using Options ROMPaq (available from www.compaq.com): SCSI Port *Y* SCSI ID *Z* (RESUME = F1 OR F2 KEY)	None	Firmware update need indicated	The indicated drives are running firmware that is known to cause intermittent problems. Use the Compaq Options ROMPaq utility to upgrade firmware on all drives to the latest revision. Acquire from the Compaq website: http://www.compaq.com/support
1771-Primary Disk Port Address Assignment Conflict	None	Internal and external hard drive controllers are both assigned to the primary address.	Run the System Configuration Utility and correct.
1772-Secondary Disk Port Address Assignment Conflict	None	Address Assignment Conflict. Internal and external hard drive controllers are both assigned to the secondary address.	Run the System Configuration Utility and correct.
1773-Primary Fixed Disk Port Assignment Conflict	None	Fixed disk drive error detected.	Run the System Configuration Utility and correct.
1774-Slot X Drive Array - Obsolete data found in Array Accelerator Select **F1** to discard contents of Array Accelerator Select **F2** to write contents of Array Accelerator to drives	None	SMART-2 Controller error detected.	Data found in array accelerator is older than data found on drives. Press **F1** to discard the older data in the array accelerator and retain the newer data on the drives.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1775-Slot X Drive Array - ProLiant Storage System Not Responding SCSI Port Y: Check storage system power switch and cables. Turn the system power off while checking the ProLiant power and cable connections, then turn the system power back on to retry.	None	Storage system problem detected.	Turn off power to system. Check external ProLiant power switch – external drives must all be powered up before or at the same time as the main system. Check cables. If retry does not help, try replacing the cable, firmware, backplane, or the Smart Array Controller.
1776-Slot *X* Drive Array – SCSI Bus Termination Error – Internal and external drives cannot both be attached to the same SCSI port SCSI port *Y*: Check cables RESUME = F1 Key	None	External and internal connectors of the specified SCSI ports are both attached to drives. The indicated SCSI bus is disabled until this problem is resolved.	The SCSI bus is not properly terminated when internal and external drives are attached concurrently to the same SCSI bus. 1. Turn off power to the server. 2. Verify cabling to the specified port. 3. Reconfigure drives as indicated.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1777-Slot *X* Drive Array – ProLiant Drive Storage Enclosure Problem Detected (followed by one or more of the following): SCSI Port *Y*: Cooling Fan Malfunction Detected SCSI Port *Y*: Overheated Condition Detected SCSI Port *Y*: Side-Panel must be Closed to Prevent Overheating SCSI Port *Y*: Redundant Power Supply Malfunction Detected SCSI Port *Y*: Wide SCSI Transfer Failed SCSI Port *Y*: Interrupt Signal Inoperative (RESUME = F1 KEY)	None	Temperature violation detected.	Check cooling fan operation by placing hand over fan. Verify internal plenum cooling fan in tower servers or storage systems is operational. If fan is not operating, check for obstructions and verify all internal connections. Replace unit side panel if removed. If the ProLiant Storage System power LED is amber instead of green, this indicates a redundant power supply failure. Check SCSI cables. If the message indicates to check SCSI cables, verify your cabling against the diagrams in your Compaq Smart Array Controller user guide. If the routing is correct, replace cables on the specified port until the POST message is eliminated.
1778-Drive Array resuming Automatic Data Recovery process	None	This message appears whenever a controller reset or power cycle occurs while Automatic Data Recovery is in progress.	No action necessary.
1779-Slot *X* Drive Array – Replacement drive(s) detected OR previously failed drive(s) now operational. Port *Y*: SCSI ID *Z* Restore data from backup if replacement drive *X* has been installed	None	Intermittent drive failure and/or possible loss of data detected.	If this message displays and drive *X* has not been replaced, this indicates an intermittent drive failure. This message also displays immediately following drive replacement whenever data must be restored from backup.
1780-Disk 0 Failure	None	Hard drive/format error detected.	Run Compaq Diagnostics. Replace failed assembly as indicated.
1781-Disk 1 Failure	None	Hard drive/format error detected.	Run Compaq Diagnostics. Replace failed assembly as indicated.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1782-Disk Controller Failure	None	Hard disk drive circuitry error detected.	Run Compaq Diagnostics. Replace failed assembly as indicated.
1783-Slot X Drive Array Controller Failure	None	ROM installation problem or array accelerator board problem detected.	If this message displays immediately following a ROM installation, the ROM is defective or not installed properly.Check to see if the array accelerator board is attached properly. Check that the array controller is firmly inserted in its slot. Try upgrading the System ROM. Otherwise, replace the Smart Array Controller.
1784-Slot X Drive Array Drive Failure. The following SCSI drive(s) should be replaced. SCSI Port *Y*: SCSI ID *Z*:	None	Defective drive and/or cables detected.	Check for loose cables. Replace defective drive *X* and/or cable(s).

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1785-Slot X Drive Array not Configured (followed by one of the following): (1) Run Compaq Array Configuration Utility (2) No drives detected (3) Drive positions appear to have changed – Run Drive Array Advanced Diagnostics if previous positions are unknown. Then turn system power OFF and move drives to their original positions (4) Configuration information indicates drive positions beyond the capability of this controller. This may be due to drive movement from a controller that supports more drives than the current controller. (5) Configuration information indicates drives were configured on a controller with a newer firmware version (RESUME = F1 KEY)	None	Drive array configuration not detected.	(1) Run the Compaq Array Configuration Utility (2) Turn off system and check SCSI cable connections to make sure drives are attached properly. (3) Run Array Diagnostic Utility if previous positions are unknown. Then turn system power off and move drives to their original positions (4) To avoid data loss, turn system power off and reattach drives to the original controller. (5) To avoid data loss, reattach drives to the original controller or upgrade the controller firmware to the version on the original controller using Option ROMPaq Press **F1** to resume

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1786-Slot 1 Drive Array Recovery Needed. The following SCSI drive(s) need Automatic Data Recovery: SCSI Port 1: SCSI ID 0 Select F1 to continue with recovery of data to drive. Select F2 to continue without recovery of data to drive. -Or- Slot 1 Drive Array Recovery Needed. Automatic Data Recovery Previously Aborted! The following SCSI drive(s) need Automatic Data Recovery: SCSI Port 1: SCSI ID 0 Select F1 to retry Automatic Data Recovery to drive. Select F2 to continue without starting Automatic Data Recovery data to drive data to drive.	None	System in Interim Data Recovery mode. Data has not yet been recovered.	Press **F1** to allow Automatic Data Recovery to begin. Data is automatically restored to drive *X* once the drive has been replaced or seems to be working. -Or- 1. Press **F2** for the system to continue to operate in the Interim Data Recovery mode. The "previously aborted" version of the 1786 POST message displays if the previous rebuild attempt was aborted for any reason. 2. Run Array Diagnostic Utility (ADU) for more information. If the replacement drive was failed, try using another replacement drive. -Or- If rebuild was aborted due to a read error from another physical drive in the array, back up all readable data on the array, run Diagnostics Surface Analysis, and then restore your data.
1787-Drive Array Operating in Interim Recovery Mode. Physical drive replacement needed: Drive *X*	None	Hard drive *X* failed or cable is loose or defective. Following a system restart, this message reminds you that drive *X* is defective and fault tolerance is being used.	1. Replace drive *X* as soon as possible. 2. Check loose cables. 3. Replace defective cables.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
***1788-Slot *X* Drive Array Reports Incorrect Drive Replacement. The following SCSI drive(s) should have been replaced: SCSI Port *Y*: SCSI ID *Z* The following SCSI drive(s) were incorrectly replaced: SCSI Port *y*: SCSI ID *z* Select F1 to continue – drive array will remain disabled. Select F2 to reset configuration – all data will be lost.	None	Drives are not installed in their original positions, so the drives have been disabled. See note below.	1. Reinstall the drives correctly as indicated. 2. Press **F1** to restart the computer with the drive array disabled. -Or- Press **F2** to use the drives as configured and lose all the data on them.

*** The 1788 error message might also be displayed inadvertently due to a bad power cable connection to the drive, noise on the data cable, or a defective SCSI cable. If this message was due to a bad power cable connection, but not incorrect drive replacement, repair the connection and press **F2.** If the message is not eliminated by pressing **F2,** run Array Diagnostic Utility (ADU) to resolve.

-Or-

If this message was not due to a bad power cable connection, and no drive replacement took place, this could indicate noise on the data cable. Check cable for proper routing.

-Or-

If this message is due to a defective SCSI cable, replace the cable.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1789-Slot *X* Drive Array SCSI Drive(s) Not Responding. Check cables or replace the following SCSI drives: SCSI Port *Y*: SCSI ID *Z* Select F1 to continue – drive array will remain disabled Select F2 to failed drives that are not responding – Interim Recovery Mode will be enabled if configured for fault tolerance	None	Cable or hard drive failure occurred	1. Check the cable connections. 2. If cables are connected, replace the drive. 3. If you do not want to replace the drives at this time, press **F2.**
1790-Disk 0 Configuration Error	None	Hard drive error or wrong drive type detected.	Run the System Configuration Utility and Diagnostics and Compaq Diagnostics and correct. Replace failed assembly as indicated.
1791-Disk 1 Error	None	Hard drive error or wrong drive type detected.	Run the System Configuration Utility and Diagnostics and Compaq Diagnostics and correct. Replace failed assembly as indicated.
1792-Drive Array Reports Valid Data Found in Array Accelerator Data will automatically be written to drive array.	None	This indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Power was then restored within 8 to 10 days, and the data in the array accelerator was flushed to the drive array.	No action necessary, no data has been lost. Perform orderly system shutdowns to avoid data remaining in the array accelerator.
1792-Secondary Disk Controller Failure	None	Part of the IDE drive electronics has failed.	Run Compaq Diagnostics and replace failed assembly as indicated.
1793-Secondary Controller or Disk Failure	None	The IDE controller or an attached drive has failed.	Run Compaq Diagnostics and replace failed assembly as indicated.
1793-Drive Array - Array Accelerator Battery Depleted - Data Lost (Error message 1794 also displays.)	None	This indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. Array accelerator batteries failed. Data in array accelerator has been lost.	Power was not restored within 8 to 10 days. Perform orderly system shutdowns to avoid data remaining in the array accelerator.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1794-Drive Array - Array Accelerator Battery Charge Low. Array Accelerator is temporarily disabled. Array Accelerator will be re-enabled when battery reaches full charge.	None	This is a warning that the battery charge is below 75%. Posted-writes are disabled.	Replace the array accelerator board if batteries do not recharge within 36 power-on hours.
1795-Drive Array - Array Accelerator Configuration Error. Data does not correspond to this drive array. Array Accelerator is temporarily disabled.	None	This indicates that while the system was in use, power was interrupted while data was in the array accelerator memory. The data stored in the array accelerator does not correspond to this drive array.	Match the array accelerator to the correct drive array, or run the System Configuration Utility to clear the data in the array accelerator.
1796-Drive Array - Array Accelerator Not Responding. Array Accelerator is temporarily disabled.	None	Array accelerator is defective or has been removed.	1. Check that the array accelerator is properly seated. 2. Run the System Configuration Utility to reconfigure the Compaq IDA-2 without the array accelerator.
1797-Drive Array - Array Accelerator Read Error Occurred. Data in Array Accelerator has been lost. Array Accelerator is disabled.	None	Hard parity error while reading data from posted-writes memory.	Enable array accelerator.
1798-Drive Array - Array Accelerator Write Error Occurred. Array Accelerator is disabled.	None	Hard parity error while writing data to posted-writes memory.	Enable array accelerator.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Recommended Action
1799-Drive Array - Drive(s) Disabled due to Array Accelerator Data Loss. Select "F1" to continue with logical drives disabled. Select "F2" to accept data loss and to re-enable logical drives	None	Volume failed due to loss of data in posted-writes memory	Press **F1** to continue with logical drives disabled or **F2** to accept data loss and re-enable logical drive.
1800-Temperature Alert	None	System has exceeded allowable temperature thresholds.	1. Turn system off and allow it to cool. 2. Check fans for proper airflow and obstructions. 3. Check fans for proper operation. 4. Analyze ambient temperature in which the server is currently operating, and compare to user documentation recommendations. 5. Adjust as needed before restarting the server

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Diagnostics Software

Test Error Codes tables include all test error codes generated by Compaq products. Each code has a corresponding description and recommended actions. Each system generates only those codes that apply to its configuration and options.

When you select Diagnostics and Utilities from the System Configuration Utility main menu, the utility prompts you to test, inspect, upgrade, and diagnose the server.

Diagnostics and Utilities is located on the system partition on the hard drive and must be accessed when a system configuration error is detected during the Power-On Self-Test (POST). Compaq Diagnostics software is also available on the Compaq SmartStart and Support Software CD. You can create a Diagnostics diskette from the SmartStart and Support Software CD. See the "Running Compaq Utilities" section earlier in this chapter for more information.

The following options are available from the Diagnostics and Utilities menu:

- Test Computer
- Inspect Computer
- Upgrade Firmware
- Remote Utilities
- Diagnose Drive Array

Diagnostic error codes are generated when the Diagnostics software recognizes a problem. These error codes help identify possible defective subassemblies.

Steps for Diagnostics

In each case, the Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics utility to verify that the error condition has been corrected. If the error code reappears:

1. Perform the next step listed in the table.
2. Run the Diagnostics program again.
3. Follow this procedure until the Diagnostics program no longer detects an error condition.

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100 – 199, Primary Processor Test Error Codes

The 100 series of diagnostic error codes identifies failures with processor and system board functions.

Table 3-3
Primary Processor Test Error Codes

Error Code	Description	Recommended Action
101-xx	CPU test failed.	Replace the processor board and retest.
103-xx	DMA page registers test failed.	For error codes 103-xx through 106-xx, replace the processor board and retest.
104-xx	Interrupt controller master test failed.	
105-xx	Port 61 error occurred.	
106-xx	Keyboard controller self-test failed.	
107-xx	CMOS RAM test failed.	The following steps apply to error codes 107-xx through 109-xx.
108-xx	CMOS interrupt test failed.	1. Replace the battery/clock module and retest.
109-xx	CMOS clock load data test failed.	2. Replace the system board and retest.
110-xx	Programmable timer load data test failed.	For error codes 110-xx through 113-xx, replace the processor board and retest.
111-xx	Refresh detect test failed.	
113-xx	Protected mode test failed.	
114-xx	Speaker test failed.	1 Verify the speaker connection and retest. 2. Replace the speaker and retest. 3. Replace the system board and retest.
116-xx	Cache test failed.	Replace the system board and retest.
122-xx	Multiprocessor Dispatch test failed.	The following steps apply to error codes 122-xx and 123-xx.
123-xx	Interprocessor Communication test failed.	1. Check the system configuration and retest. 2. Replace the processor board and retest. 3. Replace the system board and retest.
199-xx	Installed devices test failed.	1. Check the system configuration and retest. 2. Verify cable connections and retest. 3. Check switch and/or jumper settings and retest. 4. Run the System Configuration Utility and retest. 5. Replace the processor board and retest. 6. Replace the system board and retest.

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200 – 299, Memory Test Error Codes

The 200 series of diagnostic error codes identifies failures with the memory subsystem.

Table 3-4
Memory Test Error Codes

Error Code	Description	Recommended Action
200-xx	Invalid memory configuration	Reinsert memory modules in correct location and retest.
201-xx 202-xx	Memory machine ID test failed. Memory system ROM checksum failed	The following steps apply to error codes 201-xx and 202-xx. 1. Replace the system ROM and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
203-xx 204-xx 205-xx 206-xx	Memory write/read test failed. Memory address test failed. Walking I/O test failed. Increment pattern test failed.	The following steps apply to error codes 203-xx through 206-xx. 1. Replace the memory module and retest. 2. Replace the processor and retest. 3. Replace the memory expansion board and retest.
207-xx	Invalid memory configuration; check DIMM installation. DIMMs installed have 8K refresh.	Replace memory modules.
208-xx	Invalid memory speed detected; check DIMM installation. Slow DIMMs may cause data loss.	Verify memory installed, then refer to your server user documentation for supported memory and replace memory modules as indicated.
210-xx	Random pattern test failed.	1. Replace the memory module and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
0211-01	RAND test failed.	The following steps apply to error codes 0211-01 through 0211-05. 1. Replace the memory module/board and retest. 2. Replace the system board and retest.
0211-02	Error while saving test block.	
0211-03	Error while restoring test block.	
0211-04	Insufficient memory to perform test.	
0211-05	Failed inverted pattern compare, but RAM was correct.	
0212-01	RAM long test failed.	The following steps apply to error codes 0212-01 through 0212-89. 1. Replace the memory module/board and retest. 2. Replace the system board and retest. 3. Replace the memory expansion board and retest.
0212-02	Error while saving test block.	
0212-03	Error while restoring test block.	
0212-89	ECC error during testing.	

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Error Code	Description	Recommended Action
0214-01	Data error during test.	The following steps apply to error codes 0214-01 through 0214-89. 1. Replace the memory module/board and retest. 2. Replace the system board and retest.
0214-89	ECC error during testing.	
215	Nonfunctioning DC-DC converter for processor X	Replace the Processor Power Module (PPM).

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300 – 399, Keyboard Test Error Codes

The 300 series of diagnostic error codes identifies failures with keyboard and system board functions.

Table 3-5
Keyboard Test Error Codes

Error Code	Description	Recommended Action
301-xx	Keyboard short test, 8042 self-test failed.	The following steps apply to error codes 301-xx through 304-xx. 1. Check the keyboard connection. If disconnected, turn off the computer, connect the keyboard, turn on the power, and retest. 2. Replace the keyboard and retest. 3. Replace the system board and retest.
302-xx	Keyboard long test failed.	
303-xx	Keyboard LED test, 8042 self-test failed.	
304-xx	Keyboard typematic test failed.	

400 – 499, Parallel Printer Test Error Codes

The 400 series of diagnostic error codes identifies failures with parallel printer interface card or system board functions.

Table 3-6
Parallel Printer Test Error Codes

Error Code	Description	Recommended Action
401-xx	Printer failed or not connected.	The following steps apply to error codes 401-xx through 498-xx. 1. Connect the printer and retest. 2. Check the power to the printer and retest. 3. Install the loopback connector and retest. 4. Check the switch on the serial/parallel interface board (if applicable) and retest. 5. Replace the serial/parallel interface board (if applicable) and retest. 6. Replace the system board and retest.
402-xx	Printer data register failed.	
403-xx	Printer pattern test failed.	
498-xx	Printer failed or not connected.	

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500 – 599, Video Display Unit Test Error Codes

The 500 series of diagnostic error codes identifies failures with video or system board functions.

Table 3-7
Video Display Unit Test Error Codes

Error Code	Description	Recommended Action
501-xx	Graphics controller test failed.	The following steps apply to error codes 501-xx through 516-xx. 1. Replace the monitor and retest. 2. Replace the graphics controller and retest, -Or- If the controller is on a separate card, replace the graphics controller and retest. 3. Replace the system board and retest.
502-xx	Graphics memory test failed.	
503-xx	Graphics attribute test failed.	
504-xx	Graphics character set test failed.	
505-xx	Graphics 80 x 25-mode 9 x 14 character cell test failed.	
506-xx	Graphics 80 x 25-mode 8 x 8 character cell test failed.	
507-xx	Graphics 40 x 25-mode test failed.	
508-xx	Graphics 320 x 200-mode color set 0 test failed.	
509-xx	Graphics 320 x 200-mode color set 1 test failed.	
510-xx	Graphics 640 x 200-mode test failed.	
511-xx	Graphics screen memory page test failed.	
512-xx	Graphics gray scale test failed.	
514-xx	Graphics white screen test failed.	
516-xx	Graphics noise pattern test failed.	

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600 – 699, Diskette Drive Test Error Codes

The 600 series of diagnostic error codes identifies failures with diskette, diskette drive, or system board functions.

Table 3-8
Diskette Drive Test Error Codes

Error Code	Description	Recommended Action
600-xx	Diskette ID drive types test failed	The following steps apply to error codes 600-xx through 610-xx. 1. Replace the diskette and retest. 2. Check and/or replace the diskette power and signal cables and retest. 3. Replace the diskette drive and retest. 4. Replace the system board and retest.
601-xx	Diskette format failed	
602-xx	Diskette read test failed.	
603-xx	Diskette write/read/compute test failed	
604-xx	Diskette random seek test failed.	
605-xx	Diskette ID media failed.	
606-xx	Diskette speed test failed	
607-xx	Diskette wrap test failed	
608-xx	Diskette write protect test failed.	
609-xx	Diskette reset controller test failed	
610-xx	Diskette change line test failed	
699-xx	Diskette drive/media ID error.	1. Replace the media and retest. 2. Run the System Configuration Utility and retest.

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1100 – 1199, Serial Test Error Codes

The 1100 series of diagnostic error codes identifies failures with serial/parallel interface board or system board functions.

Table 3-9
Serial Test Error Codes

Error Code	Description	Recommended Action
1101-xx 1109-xx	Serial port test failed. Clock register test failed.	The following steps apply to error codes 1101-xx through 1109-xx. 1. Check the switch settings on the serial/parallel interface board (if applicable) and retest. 2. Replace the serial/parallel interface board (if applicable) and retest. 3. Replace the system board and retest.

1200 – 1299, Modem Communications Test Error Codes

The 1200 series of diagnostic error codes identifies failures with the modem.

Table 3-10
Modem Communications Test Error Codes

Error Code	Description	Recommended Action
1201-xx	Modem internal loopback test failed.	The following steps apply to error codes 1201-xx through 1210-xx. 1. Refer to the modem documentation for correct setup procedures and retest. 2. Check the modem line and retest. 3. Replace the modem and retest.
1202-xx	Modem time-out test failed.	
1203-xx	Modem external termination test failed.	
1204-xx	Modem auto originate test failed.	
1206-xx	Dial multi-frequency tone test failed.	
1210-xx	Modem direct connect test failed.	

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6000 – 6099, Compaq NIC Boards Test Error Codes

The 6000 series of diagnostic error codes identifies failures with 32-bit Dualspeed NetFlex-2/Token Ring controllers.

Table 3-11
Compaq Network Interface Board Test Error Codes

Error Code	Description	Recommended Action
6000-xx	Network card ID failed.	The following steps apply to error codes 6000-xx through 6092-xx. 1. Check the controller installation in the EISA slot. 2. Check the interrupt type and number setting. 3. Check the media connection at the controller and Multistation Access Unit (MAU). 4. Check the media speed (4/16) and type of Unshielded Twisted Pair/Shielded Twisted Pair (UTP/STP) settings. 5. Check the MAU, cabling, or other network components. 6. Replace the controller.
6001-xx	Network card setup failed.	
6002-xx	Network card transmit failed.	
6014-xx	Network card configuration failed.	
6016-xx	Network card reset failed.	
6028-xx	Network card internal failed.	
6029-xx	Network card external failed.	
6089-xx	Network card open failed.	
6090-xx	Network card initialization failed.	
6091-xx	Network card internal loopback failed.	
6092-xx	Network card external loopback failed.	

6500 – 6599, SCSI Hard Drive Test Error Codes

The 6500 series of diagnostic error codes identifies failures with SCSI hard drives, SCSI hard drive controller boards, SCSI bard drive cabling, and system board functions. If the system uses a drive array controller, see the section for Array Diagnostic Utility (ADU).

Table 3-12
SCSI Hard Drive Test Error Codes

Error Code	Description	Recommended Action
6500-xx	SCSI disk ID drive types test failed.	The following steps apply to error codes 6500-xx through 6528-xx. 1. Run the System Configuration Utility and verify the drive type. 2. Run the System Configuration Utility and verify the drive type. 3. Replace the SCSI disk drive signal and power cables and retest. 4. Replace the SCSI controller and retest. 5. Replace the SCSI disk drive and retest. 6. Replace the system board and retest.
6502-xx	SCSI disk unconditional format test failed.	
6505-xx	SCSI disk read test failed.	
6506-xx	SCSI disk SA/media test failed.	
6509-xx	SCSI disk erase tape test failed.	
6523-xx	SCSI disk random read test failed.	
6528-xx	Media load/unload test failed.	

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6600 – 6699, SCSI/IDE CD-ROM Drive Test Error Codes

The 6600 series of diagnostic error codes identifies failures with the CD-ROM drive cabling, CD-ROM drives, adapter boards, or the system board assembly.

Table 3-13
SCSI/IDE CD-ROM Drive Test Error Codes

Error Code	Description	Recommended Action
6600-xx 6605-xx 6608-xx	CD-ROM ID failed CD-ROM read failed SCSI controller test failed.	The following steps apply to error codes 6600-xx through 6608-xx. 1. Replace the CD-ROM media and retest. 2. Check and/or replace the signal cable and retest. 3. Check the switch settings on the adapter board (if applicable). 4. Replace the SCSI controller (if applicable) and retest. 5. Replace the CD-ROM drive and retest. 6. Replace the system board and retest.

6700 – 6799, SCSI Tape Drive Test Error Codes

The 6700 series of diagnostic error codes identifies failures with tape cartridges, tape drives, media changers, tape drive cabling, adapter boards, or the system board assembly.

Table 3-14
SCSI Tape Drive Test Error Codes

Error Code	Description	Recommended Action
6700-xx 6706-xx 6708-xx 6709-xx 6728-xx	SCSI tape ID drive types test failed SCSI disk SA/media test failed SCSI controller test failure. SCSI disk erase tape test failed Media load/unload test failed	The following steps apply to error codes 6700-xx through 6728-xx. 1. Run the System Configuration Utility and verify the drive type. 2. Replace the SCSI tape drive signal and power cables and retest. 3. Replace the SCSI controller and retest. 4. Replace the SCSI tape drive and retest. 5. Replace the system board and retest.

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8600 – 8699, Pointing Device Interface Test Error Codes

The 8600 diagnostic error code identifies failures with the pointing device (mouse, trackball, and so on) or the system board assembly.

Table 3-15
Pointing Device Interface Test Error Code

Error Code	Description	Recommended Action
8601-xx	Pointing device interface test failed.	1. Replace with a working pointing device and retest. 2. Replace the system board and retest.

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Array Diagnostic Utility

Array Diagnostic Utility (ADU) is a Windows-hased software tool designed to run on all Compaq servers that support Compaq array controllers and are running SmartStart 4.10 or later. The two main functions of ADU are to collect all possible information ahout array controllers in the system and to generate a list of detected problems. The error messages and codes listed include all codes generated hy Compaq products. The system generates only codes applicahle to the configuration and options in the server.

ADU works hy issuing multiple commands to the array controllers to determine if a problem exists. This data can then he saved to a file. In severe situations, this file can he sent to Compaq for analysis. In most cases, ADU provides enough information to initiate problem resolution immediately.

NOTE: ADU does not write to the drives, destroy data, or change or remove configuration information.

Starting ADU

1. Insert the SmartStart and Support Software CD into the CD-ROM drive.
2. Rehoot the system from the SmartStart and Support Software CD.
3. Select Array Diagnostic Utility (ADU) from the System Utilities menu.

   A "Please Wait" panel displays, indicating that ADU is identifying the system parameters. ADU gathers information from all of the array controllers in the system. The time it takes to gather this information depends on the size of the system. When the information gathering process is complete, ADU displays the main screen or a panel indicating any problems detected.

   CAUTION: Do not cycle the power during this process. ADU must perform low-level operations that, if interrupted, could cause the controller to revert to a previous level of firmware if the firmware was soft-upgraded.

4. To generate an ADU report, select File then Save Data from the Command menu.

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Table 3-16
ADU Diagnostic Messages

Message	Description	Recommended Action
Accelerator board not detected	Array controller did not detect a configured array accelerator board.	Install the array accelerator board on the array controller. If an array accelerator board is already installed, check for proper seating on the array controller board.
Accelerator error log	List of the last 32 parity errors on transfers to or from memory on the array accelerator board, displays starting memory address, transfer count, and operation (read and write)	If there are many parity errors, you may need to replace the array accelerator board.
Accelerator parity read errors: X	Number of times that read memory parity errors were detected during transfers from memory on array accelerator board.	If there are many parity errors, you may need to replace the array accelerator board.
Accelerator parity write errors: X	Number of times that write memory parity errors were detected during transfers to memory on the array accelerator board.	If there are many parity errors, you may need to replace the array accelerator board.
Accelerator status: Cache was automatically configured during last controller reset.	This can occur when cache board is replaced with one of a different size.	Normal operations should continue.
Accelerator status: Data in the cache was lost due to some reason other than the battery being discharged	Data in the cache was lost, but not because of the battery being discharged.	Ensure that the array accelerator is properly seated. If the error continues, you may need to replace the array accelerator.
Accelerator status: Dirty data detected has reached limit. Cache still enabled, but writes no longer being posted	The number of cache lines containing dirty data that cannot be flushed (written) to the drives has reached a preset limit. The cache is still enabled, but writes are no longer being posted. This error usually occurs when there is a problem with the drive(s).	Resolve problem with drive(s). The controller will then be able to write dirty data to drives and posted write operations will be restored.
Accelerator status: Dirty data detected. Unable to write dirty data to drives	At least one cache line contains dirty data that the controller has been unable to flush (write) to the drives. This problem usually occurs when there is a problem with the drive(s).	Resolve the problem with the drive(s). The controller will then be able to write dirty data to drives.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Accelerator status: Excessive ECC errors detected in at least one cache line. As a result, at least one cache line is no longer in use	At least one line in the cache is no longer in use due to excessive ECC errors detected during use of the memory associated with that cache line.	Consider replacing the cache. If cache replacement is not done remaining cache lines should continue to operate properly.
Accelerator status: Excessive ECC errors detected in multiple cache lines. As a result, the cache is no longer in use.	The number of cache lines experiencing excessive error checking and correcting (ECC) errors has reached a preset limit. Therefore the cache has been shut down.	Try reseating the cache to the controller. If that does not work, the cache should be replaced.
Accelerator status: Obsolete data detected	During reset initialization, obsolete data was found in cache. This was due to drives being moved and written to by another controller.	Normal operations should continue. The controller will either write data to the drives or discard the data completely
Accelerator status: Obsolete data was discarded	During reset initialization, obsolete data was found in cache and was discarded (not written to drives).	Normal operations should continue.
Accelerator status: Obsolete data was flushed (written) to drives	During reset initialization, obsolete data was found in cache. The obsolete data was written to the drives, but newer data may have been overwritten.	If newer data was overwritten, you may need to restore newer data; otherwise, normal operations should continue.
Accelerator status: Permanently disabled	Array accelerator board has been permanently disabled. It remains disabled until it is reinitialized using the Array Configuration Utility (ACU)	Check the Disable Code field. Run Array Configuration Utility (ACU) to reinitialize the array accelerator board.
Accelerator status: Possible data loss in cache	Possible data loss detected during power-up due to all batteries being below sufficient voltage level and no presence of identification signatures on the array accelerator board.	There is no way to determine if dirty or bad data was in the cache and is now lost.
Accelerator status: Temporarily disabled	Array accelerator board has been temporarily disabled.	Check the Disable Code field.
Accelerator status: Unrecognized status	A status returned from the array accelerator board that ADU does not recognize.	Obtain the latest version of ADU.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Accelerator status Valid data found at reset	Valid data was found in posted-write memory at reinitialization. Data will be flushed to disk.	Not an error or data loss condition. No action required.
Accelerator status Warranty alert	Catastrophic problem with array accelerator board. Refer to other messages on Diagnostics screen for exact meaning of this message.	Replace the array accelerator board.
Adapter/NVRAM ID mismatch	EISA nonvolatile RAM has an ID for a different controller from the one physically present in the slot.	Run the System Configuration Utility.
Array accelerator battery pack X not fully charged	Battery is not fully charged.	If 75% of batteries present are fully charged, array accelerator is fully operational. If less than 75% of batteries are fully charged, allow 36 hours to recharge them.
Array accelerator battery pack X below reference voltage (recharging)	Battery pack on array accelerator is below required voltage levels.	Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.
Board in use by expand operation	Array accelerator memory is in use by Expand operation.	Operate system without array accelerator board until Expand operation completes.
Board not attached	Array controller configured for use with array accelerator board, but one is not attached.	Attach array accelerator board to array controller.
Configuration signature is zero	ADU detected that nonvolatile RAM contains a configuration signature of zero. Old versions of the System Configuration Utility could cause this.	Run the latest version of System Configuration Utility to configure the controller and nonvolatile RAM.
Configuration signature mismatch	Array accelerator board configured for a different array controller board. Configuration signature on array accelerator board does not match the one stored on the array controller board.	To recognize the array accelerator board, run the Array Configuration Utility.
Controller communication failure occurred	Controller communication failure occurred.	ADU was unable to successfully issue commands to the controller in this slot.
Controller detected. NVRAM configuration not present	EISA nonvolatile RAM does not contain a configuration for this controller.	Run the System Configuration Utility to configure the nonvolatile RAM.
Controller firmware needs upgrading	Controller firmware is below the latest recommended version.	Run Options ROMPaq to upgrade the controller to the latest firmware revision.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Controller is located in special "video" slot	Controller is installed in slot for special video control signals. If controller is used in this slot, LED indicators on front panel may not function properly.	Install the controller in a different slot and run the System Configuration Utility to configure the controller and nonvolatile RAM. Then run the Array Configuration Utility to configure controller.
Controller is not configured	Controller is not configured. If controller was previously configured and you change drive locations, there may be a problem with placement of the drives. ADU examines each physical drive and looks for drives that have been moved to a different drive bay.	Look for messages indicating which drives have been moved. If none appear and drive swapping did not occur, run the Array Configuration Utility to configure the controller and run the System Configuration Utility to configure nonvolatile RAM. **Do not** run either utility if you believe drive swapping has occurred.
Controller reported POST error. Error Code: X	The controller returned an error from its internal Power-On Self Tests.	Replace the controller.
Controller restarted with a signature of zero	ADU did not find a valid configuration signature to use to get the data. Nonvolatile RAM may not be present (unconfigured) or the signature present in nonvolatile RAM may not match the signature on the controller.	Run the System Configuration Utility to configure the controller and nonvolatile RAM.
Disable command issued	The issuing of the Accelerator Disable command has disabled posted-writes. This occurred because of an operating system device driver.	Restart the system. Run the Array Configuration Utility to reinitialize the array accelerator board.
Drive (bay) X firmware needs upgrading	Firmware on this physical drive is below the latest recommended version.	Run the Options ROMPaq Utility to upgrade the drive firmware to the latest revision.
Drive (bay) X has insufficient capacity for its configuration	Drive has insufficient capacity to be used in this logical drive configuration.	Replace this drive with a larger capacity drive.
Drive (bay) X has invalid M&P stamp	Physical drive has invalid monitor and performance data.	Run the System Configuration Utility to properly initialize this drive.
Drive (bay) X has loose cable	The array controller could not communicate with this drive at power-up. This drive has not previously failed.	Check all cable connections first. The cables could be bad, loose, or disconnected. Turn on the system and attempt to reconnect signal/power cable to the drive. If this does not work, replace the cable. If that does not work, the drive may need to be replaced.
Drive (bay) X is a replacement drive	This drive has been replaced. This message displays if a drive is replaced in a fault tolerant logical volume.	If the replacement was intentional, allow the drive to rebuild.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Drive (bay) X is a replacement drive marked OK	This drive has been replaced and marked OK by the firmware. This may occur if a drive has an intermittent failure. For example, if a drive has previously failed, then when ADU is run, the drive starts working again.	Replace the drive.
Drive (bay) X is failed	The indicated physical drive has failed.	Replace the drive.
Drive (bay) X is undergoing drive recovery	This drive is being rebuilt from the corresponding mirror or parity data.	Normal operations should occur.
Drive (bay) X needs replacing	The 210-megabyte hard drive has firmware version 2.30 or 2.31.	Replace the drive.
Drive (bay) X upload code not readable	An error occurred while ADU was trying to read the upload code information from this drive.	If there were multiple errors, this drive may need to be replaced.
Drive (bay) X was inadvertently replaced	The physical drive was incorrectly replaced after another drive failed.	1. Replace the drive that was incorrectly replaced. 2. Replace the original drive that failed. Do not run the System Configuration Utility and try to reconfigure, data will be lost.
Drive Monitoring features are unobtainable	ADU unable to get monitor and performance data due to fatal command problem (such as drive time-out) or unable to get data due to these features not supported on the controller.	Check for other errors such as time-outs. If no other errors occur, upgrade the firmware to a version that supports monitor and performance, if desired.
Drive Monitoring is NOT enabled for SCSI Port X Drive ID Y	The monitor and performance features have not been enabled on this drive.	Run the System Configuration Utility to initialize the monitor and performance features.
Drive time-out occurred on physical drive bay X	ADU issued a command to a physical drive and the command was never acknowledged.	The drive or cable may be bad. Check the other error messages on the Diagnostics screen to determine resolution.
Drive X indicates position Y	Message indicates a designated physical drive, which appears to be scrambled or in a drive bay other than the one for which it was originally configured.	Examine the graphical drive representation on ADU to determine proper drive locations. Remove drive X and place it in drive position Y. Rearrange the drives according to the ADU instructions.
Duplicate write memory error	Data could not be written to the array accelerator board in duplicate due to the detection of parity errors. This is not a data loss situation.	Replace the array accelerator board.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Error occurred reading RIS copy from SCSI Port X Drive ID X	An error occurred while ADU was trying to read the reserve information sector (RIS) from this drive.	Compaq stores the hard drive configuration information in the RIS. If there were multiple errors, this drive may need to be replaced.
FYI: Drive (bay) X is non-Compaq supplied	The installed drive was not supplied by Compaq.	If problems exist with this drive, replace it with a Compaq drive.
Identify controller data did not match with NVRAM	The identify controller data from the array controller did not match the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. It could also occur if the firmware on the controller has been upgraded and the System Configuration Utility was not run.	Run the Inspect Utility to check the controller identification data. If the firmware version field is the only difference between the controller and nonvolatile RAM data, this is not a problem. Otherwise, run the System Configuration Utility.
Identify logical drive data did not match with NVRAM	The identify unit data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured.	Run the System Configuration Utility to configure the controller and nonvolatile RAM.
Insufficient adapter resources	The adapter does not have sufficient resources to perform post-write operations to the array accelerator board. Drive rebuild may be occurring.	Operate the system without the array accelerator board until the drive rebuild completes.
Inter-controller link connection could not be established	Unable to communicate over the link connecting the redundant controllers	Make sure both controllers are using the same hardware and firmware revisions. If one controller failed, replace it.
Less than 75% batteries at sufficient voltage	The operation of array accelerator board has been disabled due to less than 75% of battery packs being at sufficient voltage level.	Allow sufficient time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.
Less than 75% batteries at sufficient voltage. Battery pack X below reference voltage.	Battery pack on array accelerator is below required voltage levels.	Allow sufficient time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Logical drive X failed due to cache error	This logical drive failed due to a catastrophic cache error.	Replace the array accelerator board and reconfigure using the Array Configuration Utility.
Logical Drive X status = FAILED	This status could be issued for several reasons. ■ Logical drive is configured for No Fault Tolerance and one or more drives fail. ■ Mirroring is enabled, and any two mirrored drives fail. ■ Data Guarding is enabled, and two or more drives fail in this unit. ■ Another configured logical drive is in the Wrong Drive Replaced or Loose Cable Detected state.	Check for drive failures, wrong drive replaced, or loose cable messages. If there was a drive failure, replace the failed drive(s), then restore the data for this logical drive from the tape backup. Otherwise, follow the wrong drive replaced or loose cable detected procedures.
Logical Drive X status = INTERIM RECOVERY (volume functional, but not fault tolerant)	A physical drive in this logical drive has failed. The logical drive is operational, but the loss of an additional drive causes permanent data loss.	Replace the failed drive as soon as possible.
Logical Drive X status = LOOSE CABLE DETECTED Solution: Turn the system off and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s).	A physical drive or an external storage unit may have a cabling or connection problem.	Turn the system off and attempt to reattach any loose connections. If this does not work, replace the cable(s).
Logical Drive X status = OVERHEATED	The temperature of the Intelligent Array Expansion System drives is beyond safe operating levels, and has shut down to avoid damage.	Check the fans and the operating environment.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Logical Drive X status = OVERHEATING	The temperature of the Intelligent Array Expansion System drives is beyond safe operating levels.	Check the fans and the operating environment.
Logical Drive X status = RECOVERING (rebuilding data on a replaced drive)	A physical drive in this logical drive has failed and has now been replaced. The replaced drive is rebuilding from the mirror drive or the parity data.	Nothing needs to be done. Normal operations can occur, however, performance will be less that optimal until after completion of the rebuild process.
Logical Drive X status = WRONG DRIVE REPLACED	A physical drive in this logical drive has failed. The incorrect drive was replaced.	Replace the drive that was incorrectly replaced. Then, replace the original drive that failed with a new drive. Do not run the System Configuration Utility to reconfigure; data on drive will be lost.
Loose cable detected - logical drives may be marked FAILED until corrected	ADU found a loose cable. The Smart Array Controller is unable to communicate with one or more physical drives. One or more logical drives may be marked FAILED, and are unusable until problem is corrected	Power down the system. Check the cables for tight connection to the logical drives. Restart the system. If the same message occurs again, cables may be bad.
Loose cable detected - logical drives may be marked FAILED until corrected	Controller unable to communicate with one or more physical drives, probably because of a cabling problem. Logical drives may be in a FAILED state until the condition is corrected, preventing access to data on the controller.	Check all controller and drive cable connections.
Mirror data miscompare	Data was found at reset initialization in the posted-write memory; however, the mirror data compare test failed resulting in data being marked as invalid. Data loss is possible.	Replace the array accelerator board.
No configuration for accelerator board	The array accelerator board has not been configured.	If the array accelerator board is present, run the Array Configuration Utility (ACU) to configure the board.
NVRAM configuration present, controller not detected	EISA nonvolatile RAM has a configuration for an array controller, but there is no board in this slot. Either a board has been removed from the system or a board has been placed in the wrong slot.	Place the array controller in the proper slot or run the System Configuration Utility to reconfigure nonvolatile RAM to reflect the removal or new position.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
One or more drives is unable to support redundant controller operation	At least one drive in use does not support redundant controller operation.	Replace the drive that doesn't support redundant controller operation.
Other controller indicates different hardware model	The other controller in the redundant controller configuration is a different hardware model.	Make sure both controllers are using the same hardware model. If they are, make sure controllers are fully seated in their slots.
Other controller indicates different firmware version	The other controller in the redundant controller configuration is using a different firmware version.	Make sure both controllers are using the same firmware revision.
Other controller indicates different cache size	The other controller in the redundant controller configuration has a different size array accelerator.	Make sure both controllers are using the same capacity array accelerator.
RIS copies between drives do not match	The drives on this controller contain copies of the reserve information sector (RIS) that do not match.	The hard drives in the array do not have matching configuration information. To remedy this: 1. Resolve all other errors encountered. 2. Obtain the latest version of ADU, and then rerun ADU. 3. If unconfigured drives were added, configure these drives using the Array Configuration Utility (ACU). Once these drives are configured, the error should be resolved. 4. If drives or arrays were moved, make sure the movement adheres to the guidelines listed in the documentation for the array controller. 5. If the error persists after completing steps 1-4, contact a Compaq authorized service provider.
SCSI Port *X* Drive ID *Y* failed – REPLACE *(failure message)*	ADU detected a drive failure.	Correct the condition that caused the error, if possible, or replace the drive.
SCSI port *X*, Drive ID *Y* firmware needs upgrading	Drive's firmware may cause problems and should be upgraded.	Run Options ROMPaq to upgrade the drive's firmware to a later revision.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
SCSI Port X Drive ID Y has exceeded threshold(s)	The monitor and performance threshold for this drive has been violated.	Verify and resolve the threshold that has been violated.
SCSI Port X Drive ID Y is not stamped for monitoring	The drive has not been stamped with monitor and performance features.	To change without destroying the current configuration: 1. Run the Array Configuration Utility (ACU). 2. Change the array accelerator size and save the configuration. 3. Change the array accelerator back to the original size and save again. This should cause ACU to stamp the drive with monitoring and performance features.
SCSI port *X*, Drive ID *Y* may have a loose connection SOLUTION: Turn the system otf and attempt to reattach any loose connections. If this does not work, replace the cable(s) and connection(s).	SMART is unable to communicate with the drive, because the cable is not securely connected, or the drive cage connection has failed.	1. Turn off the system. 2. Reconnect the cable securely. 3. Restart the system. 4. If this does not solve the problem, replace the cables and connectors as needed.
SCSI Port x Drive ID Y RIS copy mismatch	The copies of RIS on drive do not match.	Drive may need to be replaced. Check for other errors.
SCSI Port X, Drive ID Y. SMART predictive failure errors Have been detected in the factory Monitor and Performance data. SOLUTION: Please replace this drive when conditions permit.	A predictive failure warning for this hard drive has been generated, and this indicates a drive failure is imminent.	Replace this drive at the earliest opportunity. See "Hot-Plug Hard Drive Replacement Guidelines" prior to performing this operation.

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
SCSI Port X Drive ID X was replaced on a good volume (failure message)	ADU found drive was replaced, even though there was no problem with the volume.	No action needs to be taken.
Set configuration command issued	The configuration of the array controller has been updated. The array accelerator board may remain disabled until it is reinitialized.	Run the System Configuration Utility to reinitialize the array accelerator board.
Soft Firmware Upgrade required	ADU has determined that the controller is running firmware that has been soft upgraded by the Compaq Upgrade Utility. However, the firmware running is not present on all drives. This could be caused by the addition of new drives in the system.	Run the Compaq Upgrade Utility to place the latest firmware on all drives.
Storage enclosure on SCSI bus X has a cabling error (bus disabled). SOLUTION: The SCSI controller has an internal and external cable attached to the same bus. Please disconnect the internal or external cable from the controller. If this controller supports multiple buses, the cable disconnected can be reattached to an available bus.	The current cabling configuration is not supported.	Refer to your user documentation for cabling guidelines, and reconfigure as indicated.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Storage enclosure on SCSI bus X indicated a door alert. SOLUTION: Be sure that the storage enclosure door is closed or the side panel is properly installed.	The side panel of the external storage unit is open.	Make sure the side panel of the storage unit is securely closed.
Storage enclosure on SCSI bus X indicated a power supply failure. SOLUTION: Replace the power supply.	A power supply in the external storage unit has failed.	Replace the power supply.
Storage enclosure on SCSI bus X indicated an overheated condition. SOLUTION: Make sure all cooling fans are operating properly. Also be sure the operating environment of storage enclosure is within temperature specifications.	The external storage unit is generating a temperature alert.	1. Verify that all fans are attached and operating properly. 2. Make sure the operating environment of the storage unit is within specifications. 3. For better airflow, remove any dust buildup from fans or other areas. 4. Check your user documentation for allowable temperature specifications and additional tips. 5. If none of the above solve this problem, replace the fan.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Storage enclosure on SCSI bus X is unsupported with its current firmware version. SOLUTION Upgrade the firmware version on the storage enclosure	The firmware version of the external storage unit is not supported	Upgrade the firmware
Storage enclosure on SCSI bus X indicated that the fan failed. SOLUTION Replace the fan	The cooling fan located in the external storage unit has experienced a failure.	Replace the fan
Storage enclosure on SCSI bus X indicated that the fan is degraded. SOLUTION this condition usually occurs on enclosures with multiple fans and one of those fans has failed. Replace any fans not operating properly.	One or more fans in the external storage unit have failed.	Replace the failed fans.
Storage enclosure on SCSI bus X indicated that the fan module is unplugged SOLUTION Make sure the fan module is properly connected.	A fan in the external storage unit is not connected properly.	Check and reseat all fan connections securely.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Storage enclosure on SCSI bus X – Wide SCSI transfer failed. SOLUTION: This may indicate a bad SCSI cable on bus X. Try replacing the cable.	A cable on bus X has failed.	1. Replace the failed cable. 2. If that does not solve the problem, contact your Compaq authorized service provider.
Swapped cables or Configuration error detected. A configured array of drives was moved from another controller that supported more drives than this controller supports. SOLUTION: Upgrade the firmware on this controller. If this doesn't solve the problem, then power down system and move the drives back to the original controller.	You have exceeded the maximum number of drives supported for this controller and the attached controller was not part of the original array configuration.	1. Upgrade the firmware on this controller. 2. If the problem is not resolved: Replace this controller with the original controller. -Or- Replace this controller with a new controller that supports the number of drives in the array.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Swapped cables or Configuration error detected A drive rearrangement was attempted while an expand operation was running. This is an unsupported operation SOLUTION Power down system then move drives back to their original location. Power on system and wait for the expand operation to complete before attempting a drive rearrangement.	One or more drive locations were changed while an expand operation was in progress.	1. Power down the server. 2. Place the drives back in their original locations. 3. Restart the server, and complete the expand operation. 4. Move the drives to their new locations after the expand operation is completed.
Swapped cables or Configuration error detected An unsupported drive arrangement was attempted. SOLUTION Power down system then move drives back to their original location.	One or more physical drives were moved, causing a configuration that is not supported.	Move all drives back to their original locations, and refer to your user documentation for supported configurations.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Swapped cables or Configuration error detected. The cables appear to be interchanged. SOLUTION: Power down system then move the drives or cables back to their original location.	ADU has detected a change in the cable configuration. One or more cables may be attached to the incorrect bus. -Or- One or more drives have been moved to new locations.	Refer to your user documentation for supported configurations and cabling guidelines. Restore to the original configuration.
Swapped cables or Configuration error detected. The configuration information on the attached drives is not backward compatible with this controller's firmware. SOLUTION: Upgrade the firmware on this controller. If this doesn't solve the problem then power down system then move drives back to the original controller.	The current firmware version on the controller cannot interpret the configuration information on the attached drives	Upgrade the firmware. -Or- If that does not solve the problem, move the drives back to the original controller.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Swapped cables or Configuration error detected.	More logical drives were created than are supported on this controller, causing lost logical drive volumes.	Identify the drives containing lost volumes, and move them to another controller so the lost volumes can be recreated. **WARNING:** Do not move a drive if it also contains valid volume data. This process will cause all valid data to be destroyed!
The maximum logical volume count *X* was exceeded during logical volume addition. All logical volumes beyond *X* have been lost and cannot be recovered. SOLUTION: Identify the drives that contain the lost logical volumes. Move those drives to another controller where the logical volumes can be recreated. NOTE! If a drive contains a valid logical volume and a lost logical volume, then do not move that drive to another controller.		

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
System board is unable to identify which slots the controllers are in.	Slot indicator on system board is not working correctly. Firmware recognizes both controllers as being installed in the same slot.	1. Make sure both controllers are fully seated in their slots. If the problem persists, this might indicate a controller problem or a system board problem. 2. Remove one of the controllers in the configuration and see if the remaining controller generates a Power-On Self-Test (POST) message. 3. Move the remaining controller to the other slot to see if it still generates a POST message. 4. Repeat these steps with the other controller. If both controllers give POST messages in one slot but not the other, it is a system board problem. If one of the controllers gives POST messages and the other controller does not, replace the controller that is giving the POST messages. Contact a Compaq authorized service provider for any warranty replacements.
The redundant controllers installed are not the same model. SOLUTION: Power down the system and verify that the redundant controllers are different models. If they are different models, replace the other controller with the same model as this one.	ADU detected two different controller models installed in a redundant controller configuration. This is not supported, and one or both controllers may not be operating properly.	Use the same controller models for redundant controller configurations.
This controller can't see the drives but the other controller can	The other controller in the redundant controller configuration can recognize the drives, but this controller cannot.	Resolve any other errors and then rerun ADU.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
This controller can see the drives but the other controller can't	The other controller in the redundant controller configuration cannot recognize the drives, but this controller can	Resolve any other errors and then rerun ADU.
Unable to communicate with drive on SCSI Port X, Drive ID Y	The array controller cannot communicate with the drive.	If the hard drive amber LED is on, replace the drive.
Unable to retrieve identify controller data. Controller may be disabled or failed SOLUTION Power down the system. Verify that the controller is fully seated. Then power the system on and look for helpful error messages displayed by the controller. If this doesn't help, contact your Compaq service provider.	ADU requested the identify controller data from the controller but was unable to obtain it. This usually indicates that the controller is not seated properly, or has failed.	1. Power down the server. 2. Verify the controller is fully seated. 3. Restart the server. 4. Resolve any error messages displayed by the controller. If this does not solve the problem, contact a Compaq authorized service provider.
Unknown disable code	A code was returned from the array accelerator board that ADU does not recognize.	Obtain the latest version of ADU.
Unrecoverable read error	Read parity errors were detected when attempting to read same data from both sides of mirrored memory. Data loss will occur.	Replace the array accelerator board.
Warning bit detected	A monitor and performance threshold violation may have occurred. The status of a logical drive may not be OK.	Check the other error messages for an indication of the problem.
WARNING - Drive Write Cache is enabled on X	Drive has its internal write cache enabled. The drive may be a third-party drive, or the operating parameters of the drive may have been altered. This condition may cause data corruption if power to the drive is interrupted.	Replace the drive with a Compaq drive, or restore the operating parameters of the drive.

continued

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Table 3-16
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
WARNING: Storage enclosure on SCSI bus X indicated it is operating in single ended mode. SOLUTION: This usually occurs when a single ended drive type is inserted into an enclosure with other drive types; and that makes the entire enclosure operate in single ended mode. To maximize performance replace the single ended drive with a type that matches the other drives.	One or more single-ended mode SCSI drives are installed in an external storage unit that operates in low voltage differential (LVD) mode.	The array will continue to operate, but installing all low voltage differential (LVD) drives will maximize performance.
Write memory error	Data could not be written to cache memory. This typically means that parity error was detected while writing data to cache. This could be caused by incomplete connection between cache and controller. This is not a data loss circumstance.	With power to system turned off, verify that the cache board is fully connected to controller.
Wrong Accelerator	This could mean that either the board was replaced in the wrong slot or placed in a system that was previously configured with another board type. Included with this message is a message indicating (1) the type of adapter sensed by ADU and (2) the type of adapter last configured in EISA nonvolatile RAM.	Check the diagnosis screen for other error messages. Run the System Configuration Utility to update the system configuration.

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Integrated Management Log

On servers supporting the Integrated Management Display, the Compaq Integrated Management Log (IML) replaces the Critical Error Log and Correctable Memory Logs. IML records system events and stores them in an easily viewable form. Each event is marked with a time-stamp with one-minute granularity.

Events listed in the Integrated Management Log are categorized as one of four event severity levels:

- **Status**—indicates that the message is informational only.
- **Repaired**—indicates that corrective action has been taken.
- **Caution**—indicates a nonfatal error condition.
- **Critical**—indicates a component failure.

The Integrated Management Log requires Compaq operating system-dependent drivers. Refer to the Compaq Support Software CD for instructions on installing the appropriate drivers.

Refer to the setup and installation guide that came with the server or to the *Integrated Management Display User Guide* provided with the Integrated Management Display option kit.

Multiple Ways of Viewing the Log

You can view an event in the IML in several ways:

- On the Integrated Management Display
- From within Compaq Insight Manager
- From within the Compaq Survey Utility
- From within the IML Management Utility

Integrated Management Display

The Integrated Management Display is an LCD panel that presents information directly at the server, assisting in diagnosing and servicing the server without a keyboard and monitor.

Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool used to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insight Manager 4.0, the agents for Windows NT and NetWare are also Web-enhanced; that is, these agents enable Web browser access and monitoring of management information.

The management agents monitor over 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to agent software. Agents act upon data by initiating information, such as statistics on network interface or storage subsystem performance.

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Viewing the Event List

1. From Compaq Insight Manager, select tbe appropriate server, then select View Device Data. The selected server displays, with buttons around its perimeter.
2. Select the Recovery button, then Integrated Management Log.
3. If a failed component bas been replaced, select the event from the list. Then select Mark Repaired.

Printing the Event List

NOTE: You can only view the event list from the Recovery/Integrated Management Log screen as described above.

1. From the Compaq Insight Manager screen, select the appropriate server.
2. Select the Configuration button, Recovery button, then Print.

Compaq Survey Utility

The Compaq Survey Utility is a serviceability tool available for Windows NT and Novell NetWare. It delivers online-configuration capture and comparison to maximize server availability. It is delivered on the Compaq Management CD in the SmartStart package or is available on the Compaq website. Refer to the Compaq Management CD for information on installing and running the Compaq Survey Utility.

After running tbe Compaq Survey Utility, view the IML by loading the output of tbe utility (typically called "survey.txt") into a text viewer such as Microsoft Notepad. The event list follows the system slot information. After opening the text file, print it using the print feature of the viewer.

Compaq IML Management Utility

The Compaq IML Management Utility is a DOS-based tool that gives you the offline ability to review, mark corrected, and print events from the IML. It is located on the Compaq SmartStart and Support Software CD. Refer to the SmartStart Installation for Servers poster, which ships with the server, for information on how to install and use the IML Management Utility.

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Event List

The Event List displays the affected components and the associated error messages. Although the same basic information displays, the format of the list may differ, depending on how you view it: on the Integrated Management Display, from within Compaq Insight Manager, or through the Compaq Survey Utility. An example of the format of an event displayed on the Integrated Management Display is as follows:

```
**001 of 010**
---caution---
03/19/1999
12:54 PM
FAN INSERTED
Main System
Location
  System Board
Fan ID: 03
**END OF EVENT**
```

Event Messages

Table 3-17
Event Messages

Event Type	Event Message	Action
Machine Environment		
Fan Failure	System Fan Failure (Fan X, Location)	Replace fan.
Fan Inserted	System Fan Inserted (Fan X, Location).	None
Fan Removed	System Fan Removed (Fan X, Location).	None
Fans Not Redundant	System Fans Not Redundant.	Add fan.
Overheat Condition	System Overheating (Zone X, Location).	Check fans.
Main Memory		
Correctable Error threshold exceeded	Corrected Memory Error threshold passed (Slot X, Memory Module X).	Replace the defective memory module.
	Corrected Memory Error threshold passed (System Memory).	Replace the memory modules one at a time (if more than one) and retest the system after each replacement.
	Corrected Memory Error threshold passed (Memory Module unknown).	Replace the memory modules one at a time (if more than one).
Uncorrectable Error	Uncorrectable Memory Error (Slot X, Memory Module X).	Replace the defective memory module.
	Uncorrectable Memory Error (System Memory).	Replace the defective memory module.

continued

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Table 3-17
Event Messages *continued*

Event Type	Event Message	Action
	Uncorrectable Memory Error (Memory Module unknown)	Replace the memory modules one at a time (if more than one) and retest the system after each replacement.
Processor		
Correctable Error Threshold exceeded	Processor Correctable error Threshold passed (Slot X, Socket X).	Replace the processor.
Uncorrectable Error	Unrecoverable Host Bus Data Parity Error.	Replace the processor.
Host Bus Error	Unrecoverable Host Bus Address Parity Error.	Call the service provider or Compaq for diagnosis.
EISA Bus	EISA Expansion Bus Master Timeout (Slot X).	Turn off server and replace EISA board.
	EISA Expansion Bus Slave Timeout.	
	EISA Expansion Board Error (Slot X).	
	EISA Expansion Bus Arbitration Error.	
PCI Bus Error	PCI Bus Error (Slot X, Bus X, Device X, Function X).	Power down PCI slot and replace board.
Power Subsystem		
Power Supply Failure	System Power Supply Failure (Power Supply X).	Replace power supply.
Power Supply Inserted	System Power Supply Inserted (Power Supply X).	None
Power Supply Removed	System Power Supply Removed (Power Supply X).	None
Power Supply Not Redundant	System Power Supplies Not Redundant.	Add power supply.
System Configuration Battery Low	Real-Time Clock Battery Failing.	Replace battery.
Power Module Failure	A CPU Power Module (System Board, Socket X).	Replace power module.
Power Module Failure	A CPU Power Module (Slot X, Socket X).	Replace power module.
Power Modules Not Redundant	System Power Modules Not Redundant.	Add power module.
AC Voltage Problem	System AC Power Problem (Power Supply X).	Check the input power voltage.
Power AC Overload	System AC Power Overload (Power Supply X).	■ Change the input power to 220V. ■ Add an additional power supply, or replace with one able to supply present load. ■ Reduce the load.

continued

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Table 3-17
Event Messages *continued*

Event Type	Event Message	Action
Automatic Server Recovery –2		
System Lockup	ASR Lockup Detected: Cause	Call the service provider or Compaq for diagnosis
Operating System		
System Crash	Blue Screen Trap: Cause [NT] Kernel Panic: Cause [UNIX] Abnormal Program Termination: Cause [NetWare]	Refer to the documentation for the operating system.
Automatic OS Shutdown	Automatic Operating System Shutdown Initiated Due to Fan Failure Automatic Operating System Shutdown Initiated Due to Overheat Condition Fatal Exception (Number X, Cause)	Refer to the documentation for the operating system.

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Rapid Error Recovery

Compaq servers provide rapid recovery services for diagnosing and recovering from errors. These tools are available for local and remote diagnosis and recovery.

Rapid recovery means fast identification and resolution of complex faults. The Rapid Recovery Engine and Insight Management Agents notify the system administrator when a failure occurs, ensuring that the server experiences minimal downtime. These features are enabled through the System Configuration Utility. These integrated server management features are:

- Automatic Server Recovery-2 (ASR-2)
- Integrated Management Logs
- Server Health Logs (on servers not supporting Integrated Management Logs)
- Storage Fault Recovery Tracking
- Storage Automatic Reconstruction
- Network Interface Fault Recovery Tracking
- Memory Fault Recovery Tracking (with option upgrade kit)
- Remote-Flash Redundant ROM

These features are discussed in more detail on the server documentation CD.

Automatic Server Recovery-2

Automatic Server Recovery-2 (ASR-2) lets the server restart automatically from the operating system or the Compaq Utilities. To use this feature, you must use the System Configuration Utility to install Compaq Utilities in the system partition.

You can enable the ASR-2 feature to restart a server after a critical hardware or software error occurs. If a critical error occurs, the server records the error information in the Integrated Management Log (IML), restarts the system, and pages you. Using the Compaq System Configuration Utility, configure the system for automatic recovery or for attended local or remote access to diagnostic and configuration tools.

NOTE: ASR-2 is available only on operating systems using the ASR-2 drivers provided by Compaq.

You can also configure ASR-2 to page an administrator when the system restarts. ASR-2 depends on the application and driver that routinely notify the ASR-2 hardware of proper system operations. If the time between ASR-2 notifications exceeds the specified period, ASR-2 assumes a fault has occurred and initiates the recovery process.

To configure ASR-2:

1. Run the System Configuration Utility.
2. Select View and Edit Details.
3. Set the software error recovery status to Enabled.
4. Set the software error recovery timeout.

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The available recovery features are:

- **Software Error Recovery**—automatically restarts the server after a software-induced server failure
- **Environmental Recovery**—allows the server to restart when temperature, fan, or AC power conditions return to normal

Unattended Recovery

For unattended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present and you selected Paging)
- Tries to restart the operating system

Often the server restarts successfully, making unattended recovery the ideal choice for remote locations where trained service personnel are not immediately available.

If ASR-2 cannot restart the server within 10 attempts, it places a critical error in the Integrated Management Log, starts the server into Compaq Utilities, and enables remote access (if you configured remote access).

To use this level of ASR-2, you must configure ASR-2 to load the operating system after restart.

Attended Recovery

For attended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present and you selected Paging)
- Starts Compaq Utilities from the hard drive
- Enables remote access

During system configuration, these utilities are placed on the system utilities partition of the hard drive.

If you have configured for dial-in access and have a modem with an auto-answer feature installed, you can dial in and remotely diagnose or reconfigure the server.

If you have configured the Compaq Utilities for network access, you can access the utilities over the network. You can use Compaq Insight Manager for dial-in or network access.

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Hardware Requirements

To use this level of ASR-2 over a modem, you need the following:

- An external Hayes-compatible modem

  NOTE: ASR does not work with PCI modems.

- System Configuration Utility and Diagnostics Utility installed on the system partition of the hard drive
- ASR-2 configured to load Compaq Utilities after restart

You can also run Compaq Utilities remotely over an IPX or IP network using the Network feature:

- To use Compaq Utilities on an IPX network, you must have Compaq Insight Manager 2.0 or later or a Novell Virtual Terminal (NVT) Terminal Emulator with VT100 or ANSI terminal capabilities.
- To use Compaq Utilities on an IP network, you must have Compaq Insight Manager 2.10 or later, or a Telnet Terminal Emulator with VT100 or ANSI capabilities.

If you are notified that ASR-2 restarted the server and you have restarted to Compaq Utilities, use the Inspect Utility or Compaq Insight Manager to view the critical error in the Critical Error Log. Run Diagnostics to diagnose and resolve the problem.

You can configure ASR-2 to restart the server into Compaq Utilities to diagnose the critical error or to start the operating system to return the server to operational status as rapidly as possible.

When you enable ASR-2 to start the operating system, the server tries to start from the primary partition. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access Compaq Utilities.

When you enable ASR-2 to start Compaq Utilities, the server restarts after a critical error and loads Compaq Utilities from the system partition on the hard drive.

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You can configure the server to start Compaq Utilities in four different ways:

- Without remote console support; for example, to run Compaq Utilities from the server console only
- With remote console support using modems for dial-in access
- With remote console support using a modem to dial a predetermined telephone number
- With remote console support through a network connection (IP or IPX)

Table 3-18
ASR-2 Features

Features	Definition
Software error recovery	If enabled, ASR-2 is activated if the operating system hangs or has a crash that results in a lockup.
Software error recovery timeout	Determines how long the server waits to enable ASR-2 after an operating system lockup
Standby recovery server option	If enabled, ASR-2 activation initiates a switch to a standby recovery server.
Standby recovery server port	Port used to communicate with the recovery server
Standby recovery timeout	Determines how long the server waits to initiate switch after ASR-2 activation.
Software error recovery boot option	Allows the server to restart either into the operating system or into Compaq Utilities
Thermal shutdown	If enabled, shuts down the server if a critical thermal error occurs.
UPS shutdown	If enabled, allows the server to perform a shutdown if a UPS is activated.
UPS shutdown threshold	Determines how long the server waits to shut down after the UPS is activated. If desired, this number should provide enough time for an administrator to perform any necessary operations or to gracefully shut down the server.

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Compaq Integrated Remote Console

The standard Compaq Integrated Remote Console performs a wide range of configuration activities. Console features include:

- Is accessible using ANSI terminal
- Operates independently of the operating system
- Provides for remote server reboot
- Provides access to system configuration
- Uses out-of-band communication with dedicated management modem installed in the server

For more information, see the *Integrated Remote Console User Guide* that shipped with the server.

IMPORTANT: Before configuring ASR-2, verify that the System Configuration Utility and Diagnostics software are installed on the system partition. ASR-2 must have this to start Compaq Utilities after a system restart. Compaq recommends this even if you configure ASR-2 to start the operating system.

Compaq Health Driver

The Compaq Health Driver continually resets the ASR-2 timer according to the frequency you specified in the System Configuration Utility (for example, 10 minutes). If the ASR-2 timer counts down to zero before being reset, due to an operating system crash or a server lockup, ASR-2 restarts the server into either Compaq Utilities or the operating system (as indicated by the System Configuration parameters). The default value is 10 minutes. The allowable settings are 5, 10, 20, and 30 minutes.

For remote and off-site (unattended) servers, setting the software error recovery timeout for 5 minutes reduces server downtime and allows the server to recover quickly. For local (attended) servers located on site, you can set the software error recovery timeout for 20 or 30 minutes, giving you time to arrive at the server to manually diagnose the problem.

The Compaq Health Driver is independent of the ASR-2 timer. You must load the Health Driver and enable the ASR-2 timer. This allows the driver to detect and log information in the IML regarding numerous hardware and software errors. However, you cannot enable the ASR-2 timer without loading the Compaq Health Driver.

Before ASR-2 restarts the server, it records any information available about the condition of the operating system in the Critical Error Log or the IML depending on the server support. This information can be used to diagnose an operating system crash or server lock-up, while still allowing the server to be restarted.

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The following ASR-2 flow chart shows the sequence of events after a hardware or software error occurs.

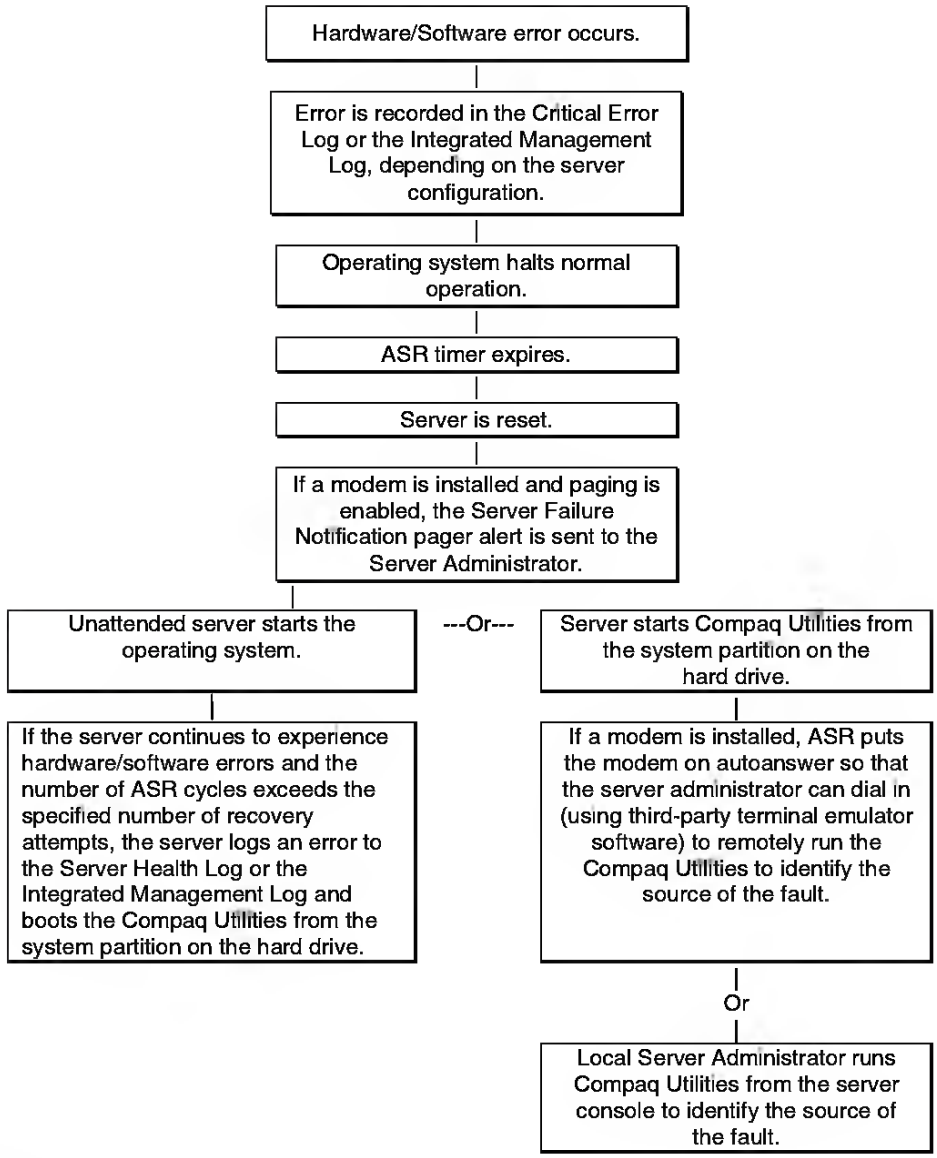
Hardware/Software error occurs.
Error is recorded in the Critical Error Log or the Integrated Management Log, depending on the server configuration.
Operating system halts normal operation.
ASR timer expires.
Server is reset.
If a modem is installed and paging is enabled, the Server Failure Notification pager alert is sent to the Server Administrator.
Unattended server starts the operating system.
---Or---
Server starts Compaq Utilities from the system partition on the hard drive.
If the server continues to experience hardware/software errors and the number of ASR cycles exceeds the specified number of recovery attempts, the server logs an error to the Server Health Log or the Integrated Management Log and boots the Compaq Utilities from the system partition on the hard drive.
If a modem is installed, ASR puts the modem on autoanswer so that the server administrator can dial in (using third-party terminal emulator software) to remotely run the Compaq Utilities to identify the source of the fault.
Or
Local Server Administrator runs Compaq Utilities from the server console to identify the source of the fault.

Figure 3-1. ASR-2 flow chart

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Booting into Compaq Utilities

When you enable ASR-2 to start into Compaq Utilities and a critical error occurs, the operating system-specific Health Driver logs the error information in the Critical Error Log or the IML and tbe ASR-2 feature restarts the server. When the system reinitializes, the system pages the designated administrator (if enabled) and starts Compaq Utilities from the hard drive.

If Dial-In status is enabled, the modem is placed in auto-answer mode. If you enable Dial-Out status, you are automatically enabled for Dial-In.

If Network Status is enabled, the appropriate network support software is loaded, depending on the network protocol, IP or IPX. This allows remote access by means of the network.

IMPDRTANT: Compaq Utilities are loaded from a specially created system partition on the hard drive. This partition was configured during server configuration.

You can access the server and view the Server Health Logs (in servers not supporting the IML) remotely by modem, in-band over the network, or directly from the server. For modem access, you must have either Compaq Insight Manager 2.0 or later or have a VT100 or ANSI terminal type device. You can use a standard CRT with VT100 or ANSI emulation capability, or you can use a PC with a VT100 or ANSI terminal emulation package. The communication parameters must be set for 8 data bits, no parity, and 1 stop bit.

You can also enable ASR-2 to allow network access using the Network Status feature in the System Configuration Utility. You must have either Compaq Insight Manager 2.0 or later or a Novell Virtual Terminal (NVT) emulator on an IPX network to use this feature. You must also have version 2.24 or later of the Compaq System Configuration Utility. For IP access, you must have Compaq Insight Manager 2.10 or later, or a Telnet Terminal emulator to use this feature. You also must have version 2.24 or later of the Compaq System Configuration Utility.

The System Configuration Utility settings should resemble the settings in Table 3-19 when you enable ASR-2 to start into Compaq Utilities.

Table 3-19
Compaq System Configuration Utility Pager Settings for Booting into Compaq Utilities

Pager Data	Setting	Description
Pager status	Enabled	Indicates whether the pager feature is enabled or disabled
Pager dial string	ATDT 555-5555	Indicates the pager dial string and delay before the pager message; pagers typically use one of the following formats: Local pagers: ATDT 555-5555 Wide area pagers: ATDT 1-800-555-5555,1234567#
Pager message	1234567#	Represents a unique number (maximum seven digits, numeric only) that you must designate to identify the server on the pager display. The ROM adds a three-digit code to the front of this number. The first two indicate the subsystem and the third indicates the severity of the error that caused the alert. The # symbol usually terminates the message. If no message is required, delete the # symbol.

continued

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Table 3-19
Compaq System Configuration Utility Pager Settings for Booting into Compaq Utilities *continued*

Pager Data	Setting	Description
Pager test	Select to test pager setup	Use this to test the current pager settings. Press **Enter** to dial the pager number, and the pager message (if present) displays. You must configure the computer before testing the pager, and the Pager Status must be set to Enabled. Do not test the pager if you are running remotely and are using only one modem.
Serial interface	COM1	Select the communications port for the modem used by the pager and the remote ASR-2 functions. The options are COM1 and COM2.
Dial-in status	Enabled	Set Dial-In Status to Enabled. Be sure the Reset Boot option is set to Boot Compaq Utilities. When the system starts because of an ASR reset, it starts to the Compaq Utilities, sets the Management Modem to auto-answer, and waits for the administrator to dial in and run the Compaq Utilities. You automatically disable this option when you configure the software error recovery start option to Boot Operating System. When ASR pages you, you cannot dial in unless ASR-2 exceeds 10, the threshold number of server restart retries. When this happens, ASR-2 restarts the server into the Compaq Utilities and places the modem in auto-answer mode.
Dial-out status	Enabled	Allows ASR-2 to dial out to a remote workstation. If you selected this option, Dial-In Status is automatically selected. To use the dial-out feature, set Dial-Out Status to Enabled and set the Dial-Out String to the correct phone number. You must also set the Reset Boot option to Boot Compaq Utilities. When the system restarts because of an ASR reset, the administrator is paged via Pager Status and Pager Dial String, the system restarts to the Compaq Utilities, and dials out to the phone number provided in the Dial-Out string. The dial-out number will be tried five times. If it fails to connect after five attempts, the modem is put in autoanswer mode.
Dial-out string	555-1234	Enter the dial string followed by the remote computer telephone number.
Network status	Enabled	To allow network access to Compaq Utilities, set Network Status to Enabled and ensure that the Reset Boot option is set to Boot Compaq Utilities.
Network protocol		To use IPX network access, set Network Protocol to IPX. When the system restarts to the Compaq Utilities because of an ASR reset, it loads IPX network support. This enables remote access using NVT. To use IP network access, set Network protocol to IP. Also make sure to set Network IP address, Network IP net mask, and Network IP router address. When the system restarts to the Compaq Utilities because of an ASR reset, it loads IP network support. This enables remote access using Telnet. **Note:** The Network Status must be set to Enabled for network access.
Network controller	Compaq	For all Compaq standard network controllers.

continued

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Table 3-19
Compaq System Configuration Utility Pager Settings for Booting into Compaq Utilities *continued*

Pager Data	Setting	Description
Network host name	CPQHOU	Enter the network name of the server. Use underscores instead of spaces within the name, for example, Compaq_Server. If you are using IPX network access to the Compaq Utilities, this server name is used to advertise NVT host services. This server name displays in the Compaq Insight Manager server list when the program determines it can communicate using NVT. Set this name to be the same as the server name you assign when the host operating system is running.
Network card slot	Slot #	Select the slot number of the network interface card to be used for network access to Compaq Utilities.
Network frame type	ETHERNET_II	Select the frame type for the network. Selections include both Ethernet and Token Ring topologies.
Network IP address		Enter the IP address for this server in standard dot notation. **Note:** This is not used if you select Custom for Network controller. You must enter the IP address in the *NET.CFG* file that you load into the system partition.
Network IP net mask		Enter the net mask for this server in standard dot notation. **Note:** This is not used if you select Custom for network controller. You must enter the IP address in the *NET.CFG* file that you load into the system partition.
Network IP router address		Enter the router to be used for this server in standard dot notation. **Note:** This is not used if you select Custom for network controller. You must enter the IP address in the *NET.CFG* file that you load into the system partition.

If you configure the server to boot into Compaq Utilities, it prepares for remote communications. You can remotely run Diagnostics software, the Inspect Utility, or the System Configuration Utility using a workstation running terminal emulation software, such as Compaq Insight Manager or PC Anywhere.

Booting into the Operating System

When you enable ASR-2 to restart into the operating system and a critical error occurs, ASR-2 logs the error in the Critical Error Log or IML and restarts the server. The system ROM pages the designated administrator, then executes the normal restart process.

IMPORTANT: When you enable ASR-2 to restart into the operating system, Modem Dial-In Status, Network Status, and Modem Dial-Out Status are automatically disabled. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access the server, and the server cannot dial out to a remote workstation.

If the ASR-2 feature cannot restart the server within 10 attempts, it logs a critical error in the Critical Error Log or IML, restarts the server into the Compaq Utilities, and puts the modem into auto-answer mode.

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The System Configuration Utility settings should resemble those in Table 3-20 when you enable ASR to restart into the operating system.

Table 3-20
OS Restart SCU Setting for ASR-2

Option	Setting
Serial interface	COM1
Dial-in status	Disabled
Dial-out status	Disabled
Dial-out string	555-1234
Network status	Disabled
Network protocol	IPX
Network controller	Compaq
Network host name	CPQHOU
Network card slot	Slot #
Network frame type	ETHERNET_II
Network IP address	xxx.xxx.xxx.xxx
Network IP net mask	xxx.xxx.xxx.xxx
Network IP router address	xxx.xxx.xxx.xxx

ASR-2 Security

The standard Compaq password features function differently during ASR-2 than during a typical system startup. During ASR-2, the system does not prompt for the power-on password. This allows ASR-2 to restart the operating system or Compaq Utilities without user intervention.

To maintain system security, set the server to boot in Network Server Mode (an option in the System Configuration Utility). This option ensures that tbe server keyboard is locked until you enter the keyboard password.

Select an administrator password (an option in the System Configuration Utility). During attended ASR-2 (local or remote), you must enter this administrator password before any modifications can be made to the server configuration.

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Server Health Logs

In some servers, Server Health Logs are replaced by the IML, if it is supported. See "Integrated Management Display" in this chapter for more information.

Server Health Logs contain information to help identify and correct any server failures and correlate hardware changes with server failure. Server Health Logs are stored in nonvolatile RAM and consist of the Critical Error Log and the Revision History Table.

If errors occur, information about the errors is automatically stored in the Critical Error Log.

Whenever boards or components (that support revision tracking) are updated to a new revision, the Revision History Table is updated.

ASR-2 Integrated Management Log Messages

The Integrated Management Log (IML), or Critical Error Log for Server Health Log, records memory errors, as well as catastrophic hardware and software errors that cause the system to fail. This information helps you quickly identify and correct the problem, thus minimizing downtime.

You can view the IML or Critical Error Log through Compaq Insight Manager. The Diagnostics Utility either resolves the error or suggests corrective action in systems that do not support event logs.

The IML or Critical Error Log identifies and records all the following errors. Each error type is explained below.

Table 3-21
ASR-2 IML or Critical Error Log Messages

Message	Description
Abnormal Program Termination	The operating system has encountered an abnormal situation that has caused a system failure.
ASR-2 detected by ROM	An ASR-2 activity has been detected and logged by the system ROM.
ASR-2 Test Event	The System Configuration Utility generated a test alert.
Automatic Server Recovery Base Memory Parity Error	The system detected a data error in base memory following a reset due to the Automatic Server Recovery-2 (ASR-2) timer expiration.
Automatic Server Recovery Extended Memory Parity Error	The system detected a data error in extended memory following a reset due to the ASR-2 timer expiration.
Automatic Server Recovery Memory Parity Error	The system ROM was unable to allocate enough memory to create a stack. Then, it was unable to put a message on the screen or continue starting the server.
Automatic Server Recovery Reset Limit Reached	The maximum number of system resets due to ASR-2 timer expiration has been reached, resulting in the loading of Compaq Utilities.
Battery Failing	Low system battery warning. Replace battery within 7 days to prevent loss of nonvolatile configuration memory. Failure of the battery supporting the system's nonvolatile RAM is imminent.

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Table 3-21
ASR-2 IML or Critical Error Log Messages *continued*

Message	Description
Caution: Temperature Exceeded	The operating system has detected that the temperature of the system has exceeded the caution level. Accompanying data in the log notes if an autoshutdown sequence has been invoked by the operating system.
Diagnostic Error	An error was detected by the Diagnostics Utility. See the specific error code in this chapter for a detailed explanation.
Error Detected On Boot Up	The server detected an error during the Power-On Self-Test (POST).
Processor Prefailure	A CPU has passed an internal corrected error threshold; excessive internal ECC cache errors.
NMI - PCI Bus Parity Error	A parity error was detected on the PCI bus.
NMI - Expansion Board Error	A board on the expansion bus indicated an error condition, resulting in a server failure.
NMI - Expansion Bus Master Time-Out	A bus master expansion board in the indicated slot did not release the bus after its maximum time, resulting in a server failure.
NMI - Expansion Bus Slave Time-Out	A board on the expansion bus delayed a bus cycle beyond the maximum time, resulting in a server failure.
NMI - Fail-Safe Timer Expiration	Software was unable to reset the system fail-safe timer, resulting in a server failure.
Processor Exception	The indicated processor exception occurred.
NMI - Processor Parity Error	The processor detected a data error, resulting in a server failure.
Server Manager Failure	An error occurred with the Server Manager/R.
NMI - Software Generated Interrupt Detected Error	Software indicated a system error, resulting in a server failure.
Caution: Temperature Exceeded	The operating system has detected that the temperature of the system has exceeded the caution level. Accompanying data in the log notes whether an autoshutdown sequence has been invoked by the operating system.
Abnormal Program Termination	The operating system has encountered an abnormal situation that has caused a system failure.
ASR-2 Test Event	The System Configuration Utility generated a test alert.
NMI - Automatic Server Recovery Timer Expiration	The operating system has received notice of an impending ASR-2 timer expiration.
Required System Fan Failure	The required system fan has failed. Accompanying data in the log notes if an auto-shutdown sequence has been invoked by the operating system.
UPS A/C Line Failure Shutdown or Battery Low	The UPS notified the operating system that the AC power line has failed. Accompanying data indicates whether either an auto-shutdown sequence has been invoked or the battery is nearly depleted.
ASR-2 detected by ROM	An ASR-2 activity has been detected and logged by the system ROM.

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Revision History Table

Some errors can be resolved by reviewing changes to the server configuration. The server has an Automatic Revision Tracking (ART) feature that helps you review recent changes to the server configuration.

One ART feature is the Revision History Table, which contains the hardware version number of the system board and any other system boards providing ART-compatible revision information. This feature lets you determine the level of functionality of an assembly in a system without opening or powering down tbe unit.

Table 3-22
Revision History Table

Previous Revisions	
Date	10/31/98
System Board Revision	03
Assembly Version	1
Functional Revision Level	C
Processor 01 Revision	01
Assembly Version	1
Functional Revision Level	A
Current Revisions	
Date	9/21/99
System Board Revision	03
Assembly Version	1
Functional Revision Level	C
Processor 01 Revision	01
Assembly Version	1
Functional Revision Level	A

The Revision History Table is stored in nonvolatile RAM and is accessed through the Inspect Utility and Compaq Insight Manager.

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Storage Fault Recovery Tracking

This feature tracks more than 12 failure-indication parameters, such as timeouts, spin-up, and self-test errors of SCSI drives. You can use these parameters to pinpoint failed storage subsystem components and to recover from controller or hard drive failure.

Storage Automatic Reconstruction

This feature automatically reconstructs data to an online spare or to a replaced drive if a drive fails. To use the reconstruction feature, you must configure the server for drive mirroring or data guarding. The reconstruction decreases system downtime by allowing rapid recovery to full system operation if a drive fails.

Network Interface Fault Recovery Tracking

This feature tracks more than 20 failure indication parameters, such as alignment errors, lost frames, and frame copy errors, of Ethernet and Token Ring network interfaces. It decreases network downtime by enabling diagnosis of network interface failures.

Memory Fault Recovery Tracking

This feature inspects the operation of the memory subsystem looking for uncorrectable memory errors.

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Remote Service Features

Compaq servers have the following management features that you can access through a modem or a network.

Table 3-23
Compaq Servers Remote Management Features

Feature	Description
Service Session	Provides remote access to all the utilities on the system partition, including Diagnostics utilities, Inspect, ROMPaq, Drive Array Advanced Diagnostics (DAAD), and the System Configuration Utility. Also provides the capability for remote file transfer services to and from the system partition.
Disk-Based Diagnostics	Provides remote diagnostic capability after you configure ASR-2 and the reset restart option to restart from Compaq Utilities. Also allows you to view Health Logs. Disk-based diagnostics can also be run locally. Press **F10** during the restart process when the cursor moves to the upper-right corner of the monitor.
Server Restart	Provides the ability to restart the server remotely from Compaq Insight Manager while the operating system is running. Allows the server to restart back to the operating system or restart to the system partition. Provides a complete system reset to all peripherals. If you select Boot to Compaq Utilities from Compaq Insight Manager, Compaq Utilities loads the appropriate remote services so that remote access is available. If network status is enabled, network support is loaded. If Dial-In status is enabled, the modem is set to auto-answer.
Configuration Utility	Allows you to run the remote System Configuration Utility locally. Press **F10** during the restart process when the cursor moves to the upper-right corner of the monitor.
Firmware Updates	Allows you to update the server firmware remotely. Uses firmware images on the system partition that might have been previously uploaded with the file transfer services.

ROMPaq Error Recovery Options

From time to time it may be necessary to upgrade the current system ROM. Some reasons for this include:

- Customer desires ROM upgrade
- Obtained new SmartStart and Support Software CD
- Upgraded server processors
- Request from Compaq

The process of upgrading the system ROM is referred to as flashing the ROM. Flashing consists of using software to replace the current ROM image with a new one through ROMPaq.

Should an error such as a power failure occur during this process, the flash operation will not be completed, causing the ROM image in the server to be corrupted. Compaq provides two options for ROMPaq recovery, depending on the server and circumstances involved.

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ROMPaq Disaster Recovery

Use the following option for any server that does not have a valid ROM image:

IMPORTANT: This operation should be performed on a server with redundant ROM **ONLY IF** both ROM images have been corrupted. If only one image is corrupted, read the following section, "Redundant ROM Image Recovery," for complete instructions.

1. Build a fresh ROMPaq diskette, using the latest version for the server involved.

   NOTE: If the ROM is corrupted by a ROMPaq interruption, the initial ROMPaq attempt may have affected the contents of the original diskette.

2. Turn off the server.
3. Set configuration switches 1, 4, 5, and 6 on the system maintenance switch block to ON to enable disaster recovery mode.

Table 3-24
Configuration Switches

Switch	Function
1	Disable on-board video
4	Disable diskette drive
5	Disable password
6	Clear NVRAM

4. Insert the ROMPaq diskette. Although you will use a normal ROMPaq diskette, this situation will not allow you to save the old image.
5. Turn on the server. The keyboard, mouse, and monitor are all inactive. The IMD is active, if the server has one.
6. The server makes two long beeps to indicate that you are in Disaster Recovery Mode and that you should insert the ROMPaq diskette. The IMD, if the server has one, displays:

   Please insert ROMPaq diskette.

7. The server reads the diskette for the latest ROM image. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.

   NOTE: The IMD will display the "Please insert ROMPaq diskette" message even after a valid ROMPaq diskette has been installed. This is normal behavior. The server will stop beeping to indicate that the diskette is a valid ROMPaq diskette.

8. The ROMPaq diskette flashes the system ROM. During this process, the IMD displays:

   ROMPaq flashing system ROM.

9. At the successful completion of this process, the IMD displays:

   ROMPaq flash successful - Cycle Power.

   Or, if the flash is not successful, the IMD displays:

   ROMPaq flash failed.

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10. After successful completion of this process:
    a. Turn off the server.
    b. Reset configuration switches 1, 4, 5, and 6. Refer to the Configuration Switches table within this section.
    c. Turn on the server as usual.

IMPORTANT: If you are performing this procedure on a server with redundant ROM, where both ROM images have been corrupted, repeat the process in succession (once for each corrupt image). If only one image is corrupt, read the following section, "Redundant ROM Image Recovery," for complete instructions.

After a failed ROMPaq, power down the server and repeat the above process.

Redundant ROM Image Recovery

If power is interrupted during the flash process on a server that has redundant ROM, the server should come up as usual (on the same image that it booted) but the inactive (redundant) ROM image will be corrupt.

A POST error message displays:

105 – Current System ROM is corrupt – now booting redundant System ROM

In this situation, you are required to flasb again so that the invalid image is now valid. After you flash the invalid image, the system will boot to that image, which was the original objective.

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Compaq Insight Manager

Compaq Insight Manager is the Compaq application for easily managing network devices. Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the servers.

In Compaq servers, every hardware subsystem, such as disk storage, system memory, and system processor, has a rohust set of management capahilities. Compaq Full-Spectrum Fault Management prevents faults before they happen, keeps the system up and running in the unlikely event of a failure, and delivers rapid server recovery to normal operation after a fault.

Features of Compaq Insight Management

Compaq Insight Management features include:

- **Weh hrowser access**—provides Insight Manager Device and Configuration information from anywhere you have network access and a standard Weh hrowser for Windows NT and NetWare servers.
- **Comprehensive fault management**—provides management for all major subsystems, including pre-failure alerts in advance of potential system failures.
- **Broad configuration management**—provides effective deployment and maintenance of consistent, manageahle configurations with Insight Version Control and Integration Server Maintenance. Version Control and Integration Server Maintenance allows the administrator to monitor and update versions of the server and workstation firmware, drivers, and utilities.
- **Performance management**—sets performance and capacity thresholds for management variables related to processor and hus utilization, NIC throughput, logical disk capacity, and more.
- **Workstation management**—monitors and manages Compaq Professional Workstations.
- **Client management—**manages faults and assets on Compaq Deskpro computers.
- **Netelligent management**—receives alarms from Netelligent devices. Full management of Netelligent devices is supported through integration with Compaq Netelligent Management Software.
- **Asset management**—exports asset information from the Compaq Insight Manager database to leading database and spreadsbeet applications.
- **Remote management**—manages in-band or out-of-band devices, online or offline, from any location.
- **Integration with enterprise management platforms**—provides integration with leading management platforms including HP OpenView, IBM NetView, SunNet Manager, and Microsoft Systems Management Server.
- **Full integration with Compaq Remote Insight Board/PCI and ProLiant Integrated Remote Console**—allows "in-band" and "out-of-band" connection for server management to ensure that customers are in toucb with their systems, even when they are offline or without power.

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- **SNMP standards**—allow integration with other management products.
- **Flexible network conductivity**—supports multiple transport protocols including IPX, TCP/IP, and PPP to operator over LANs, WANs, and modems.
- **Support for these operating systems**:
  - Microsoft Windows 2000, Microsoft Windows NT
  - Novell NetWare, intranetWare and intranetWare for Small Business
  - SCO UNIX, OpenServer, and UnixWare
  - IBM OS/2 Warp family of products
- **Reporting**—using Automatic Data Collection, gathers historic performance information for graphing or export purposes.

Compaq Insight Management Software Architecture

The Compaq Insight Management software architecture is typical of other network management solutions. It has a client/server architecture and is composed of agent software (Compaq Insight Management Agents) and the management application software (Compaq Insight Manager).

Insight Management Agents

Insight Agents operate on Compaq systems (such as servers and workstations), performing in-depth monitoring of the system's state by collecting and measuring system parameters. These parameters indicate the current state of subsystems by counting the occurrence of particular events (for example, the number of read operations performed on a disk drive) or monitoring the state of a critical function (such as whether the cooling fan is operating).

Insight Desktop Agents operate on Compaq Deskpro computers, monitoring functions that include temperature sensing and disk pre-failure alerting.

Insight Agents provide information to management applications, such as Compaq Insight Manager, and can generate alarm notifications if significant changes occur in the fault or performance aspects of system operation. Information is delivered to and from the Insight Agents by the industry-standard Simple Network Management Protocol (SNMP).

Compaq Insight Manager

Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the Compaq hardware. In the unlikely event of hardware failures, Compaq Insight Manager also provides a full complement of remote maintenance and control facilities.

For additional information, refer to the online *Compaq Insight Manager User Guide* on the server documentation CD that accompanied the server.

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Chapter 4

Connectors, Switches, and Status Indicators

Connectors

This section shows connector locations on the rear panel, I/O board, and the processor board for the Compaq ProLiant 8000 servers.

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Rear Panel

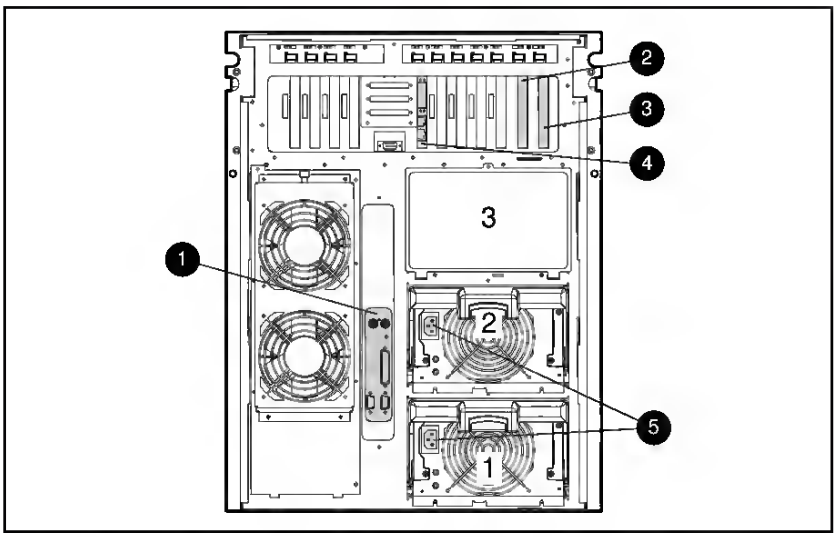

Figure 4-1. Rear panel connectors

Table 4-1
Rear Panel Connectors

Item	Description
❶	Processor board connectors (See "Processor Board" later in this chapter)
❷	64-bit/66-MHz PCI Hot Plug with Extended SCSI slot 10 (Smart Array Extended SCSI controller installed)
❸	64-bit/66-MHz PCI Hot Plug with Extended SCSI slot 11
❹	NC3131 Fast Ethernet 64 PCI Dual 10/100 NIC
❺	Power supply power connectors

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I/O Board

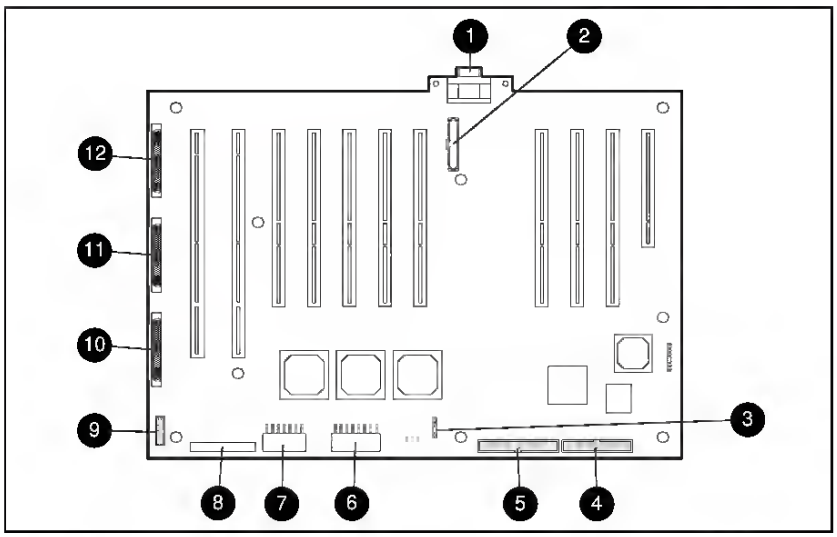

Figure 4-2. I/O board connectors

Table 4-2
I/O Board Connectors

Item	Connector	Item	Connector
❶	Video	❼	Power, 14-pin
❷	PCI Hot Plug	❽	Power signal
❸	Power switch/interlock (system power)	❾	Fan/speaker
❹	IMD	❿	Slot 10/11 SCSI port 1 (internal use only)
❺	IDE (CD-ROM drive)	⓫	Slot 10/11 SCSI port 2 (internal use only)
❻	Power, 16-pin	⓬	Slot 10/11 SCSI port 3 (internal use only)

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Processor Board

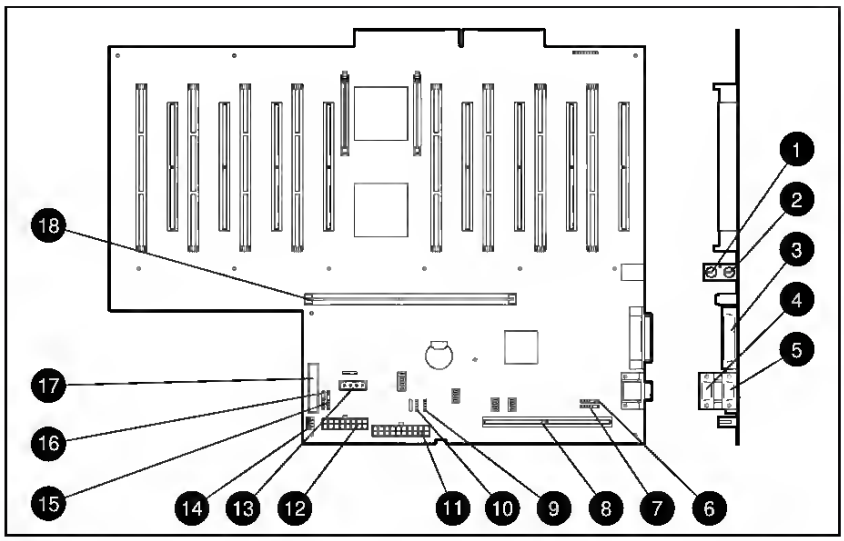

Figure 4-3. Processor board connectors

Table 4-3
Processor Board Connectors

Item	Connector	Item	Connector
❶	Keyboard	⓾	External battery
❷	Mouse	⓫	22-pin power
❸	Parallel port	⓬	18-pin power
❹	Serial port B	⓭	Removable media power
❺	Serial port A	⓮	Interlock/air sensor
❻	Internal rear processor fan	⓯	Hot-plug redundant front processor fan
❼	Hot-plug redundant rear processor fan	⓰	Internal front processor fan
❽	Processor board power module	⓱	Diskette media
❾	External battery	⓲	Memory expansion board

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Switches

This section contains information on processor board bus/core frequency ratio switch settings and internal and external battery switch settings for ProLiant 8000 servers.

Processor Board Bus/Core Frequency Ratio Switch Settings

Processor board bus/core frequency ratio switches can be set manually or by the system BIOS. Figure 4-4 shows the location of the processor board bus/core frequency ratio switches. Table 4-4 shows the bus/core frequency ratio switch settings.

CAUTION: Setting the processor switchbanks incorrectly can result in permanent damage to the processor or in data loss.

IMPORTANT: The bus/core switches come set at the Off position. This allows the ROM to automatically set the optimal speed for the buses. The server will not start if the switches are set to a speed higher than the slowest processor.

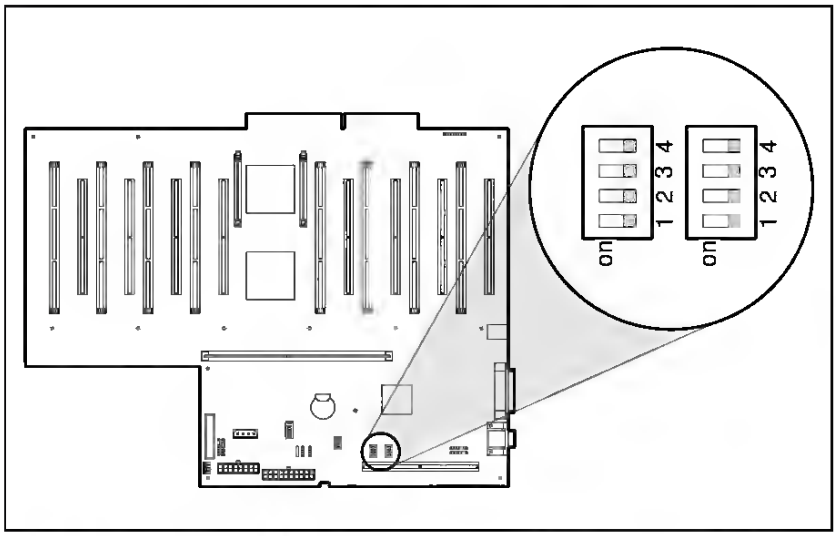

Figure 4-4 Processor board switchbank

Table 4-4
Processor Board Bus/Core Frequency Ratio Switch Settings

Bus/Core Frequency	Ratio	SW 1	SW 2	SW 3	SW 4
ROM	Auto	OFF	OFF	OFF	OFF
700 MHz	7	ON	OFF	ON	OFF

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Internal/External Battery Switch Settings

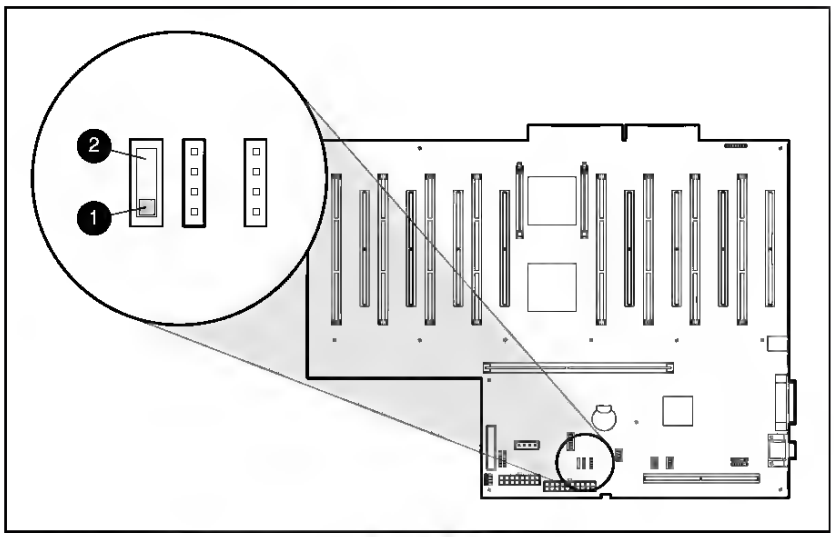

Figure 4-5. Internal and external battery switch location

Table 4-5
Internal and External Battery Switch Settings

Number	Switch Position	Battery Location
❶	Down	External
❷	Up	Internal

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Status Indicators

This section describes LED status indicator locations and functions on bot-plug I/O boards, I/O fans, PCI expansion boards, drives, and power supplies. The system interlocks provided with the ProLiant 8000 server provide a closed-loop checking mechanism for verifying proper component mating and cabling interconnects between critical server components. Three LEDs on the I/O board provide visual assistance in isolating components to cbeck if the server does not power up because of a broken interlock chain. The third LED on the I/O board indicates a power failure condition—either the Processor Power Module (VRM) or any of the components listed under the power-fail LEDs are at fault. The I/O board is located directly beneath the PCI Hot Plug access doors on the top access panel.

Front Panel System Interlock LED Status Indicators

The system interlock LED on the front panel will turn amber if the interlock chain has been broken.

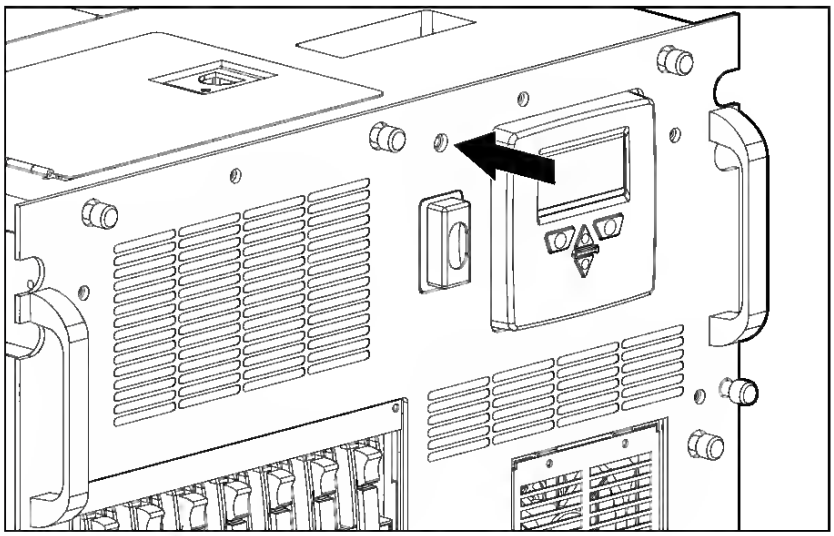

Figure 4-6. System interlock status LED

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I/O Board System Power Interlock LED Indicators

The I/O board bas LEDs that describe system interlock and power failure conditions. Figure 4-7 shows the system interlock LEDs. Table 4-6 shows troubleshooting procedures for each LED condition indicated.

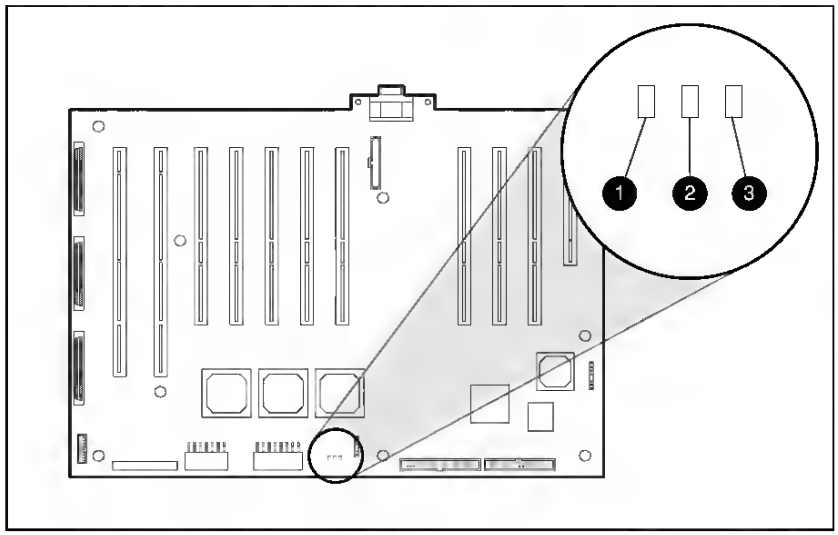

Figure 4-7. System Interlock LEDs on the I/O board

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Table 4-6
System Interlock LED Indicators on I/O Board

Possible Affected Components to Check	Interlock Power (Aux 5V) ❶	Power Fail ❷	System Interlock ❸
None (system operational)	ON	OFF	OFF
If the server does not power up:			
1. Reinsert the power supply			
2. Place the Power On/Standby switch to ON			
3. Verify that the power supply status LED blinks green for 10 to 20 seconds and then is solid green when the server powers up.			
4. If the Power Supply Status LED stays dark (does not blink), verify that the I/O board power cable is connected at the I/O board and the power backplane.			
Power switch cables	ON	OFF	ON
I/O-to-processor board connection			
Processor board components			
Processor Power Modules	ON	ON	OFF
Power supplies			
Power cables			

Note: If the System Interlock LED is on, check the processor board LEDs to isolate the failure point.

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Processor Board LED Status Indicators

If the System Interlock LED on the I/O board is illuminated, the processor board LEDs ❶ provide additional troubleshooting information for identifying the failure point.

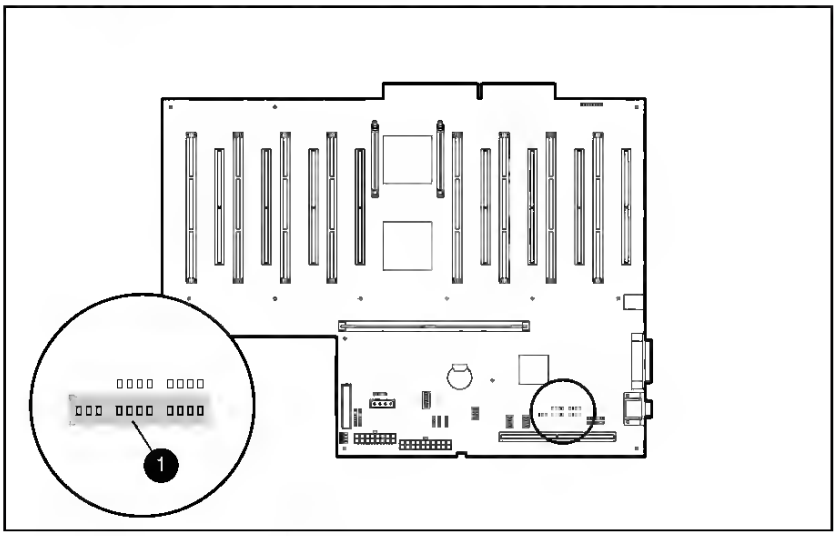

Figure 4-8. Processor board LED indicators

Starting from left to right, the number of LEDs illuminated will determine certain failure points. Refer to Table 4-7 to identify failure points.

Table 4-7
Processor Board Interlock LED Status Indicators

LEDs Lit	Failure Point	LEDs Lit	Failure Point
None	No failure ■ All connections good on processor board ■ Cables to I/O board are secure	6	Processor slot 6
1	Removable media bay	7	Processor slot 5
2	Memory board	8	Processor slot 4
3	Cables from the I/O or processor board to the power supply backplane (including the ribbon cable)	9	Processor slot 3
4	Processor slot 8	10	Processor slot 2
5	Processor slot 7	11	Processor slot 1

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Hot-Plug I/O Fan LED Status Indicators

Open the hot-plug I/O fan access door on the top access panel to view the hot-plug I/O fan LED status indicators. Figure 4-9 shows the location of these LEDs on the hot-plug I/O fans.

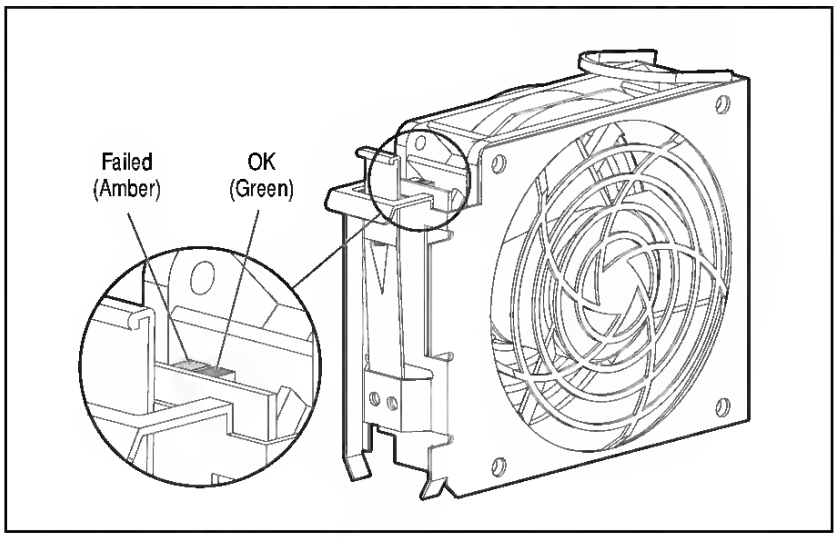

Figure 4-9. Hot-plug I/O fan LED status indicators

To verify that the fan is producing airflow, interpret the hot-plug fan indicators as shown in Table 4-8.

Table 4-8
Hot-Plug I/O Fan LED Status Indicators

Condition	Indication
Green	Power is applied to the fan and the fan is functional.
Amber	The fan has failed.
Off	Power is not applied to the fan.

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PCI Hot Plug LED Status Indicators

Each set of PCI Hot Plug LED indicators has a PCI Hot Plug button ❶ that activates or deactivates its associated PCI Hot Plug slot. The LEDs are viewed from the rear of the unit or through the PCI Hot Plug access doors on the top access panel. A PCI Hot Plug slot can also be activated or deactivated through the operating system's hot-plug software application. The PCI Hot Plug amber LED ❷ and green LED ❸ indicate the status of each inserted PCI device.

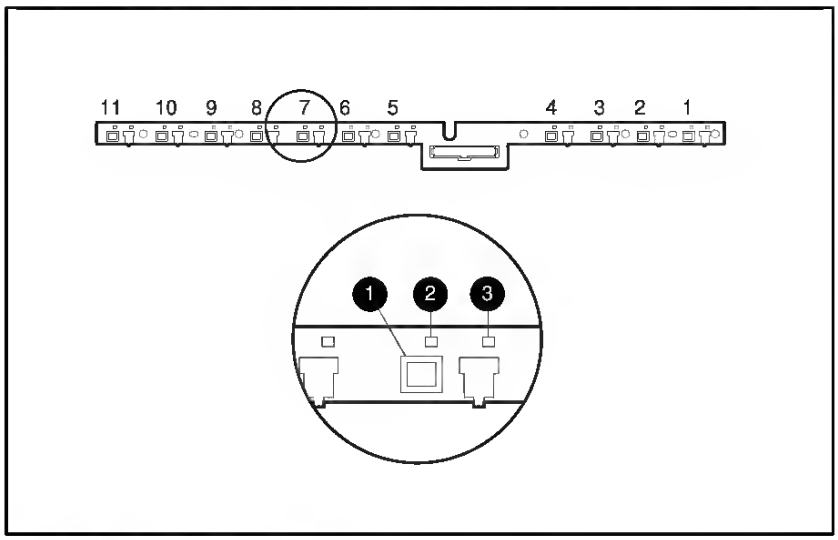

Figure 4-10. PCI Hot Plug LED indicators

Table 4-9 indicates the slot condition and status for each state of the two LEDs shown in Figure 4-10.

Table 4-9
PCI Hot Plug LED Status Indicators

Amber LED (Status) ❷	Green LED (Power) ❸	Slot Status	DK to Dpen Slot Release Lever*
Off		Slot does not require attention.	N/A
On		Slot requires attention. There may be a problem with the slot, PCI board, or driver. Check the green LED before opening the slot.	N/A
	On	Current is supplied to the slot.	No
	Flashing	The power to the slot is in the process of being turned on or off. This process may take several minutes. Do not open the slot release lever until the green LED is completely off.	No
	Off	Slot power current is off	Yes

* Not shown

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Hot-Plug Hard Drive LED Status Indicators

Figure 4-11 shows hot-plug hard drive replacement conditions indicated by the hard drive LEDs.

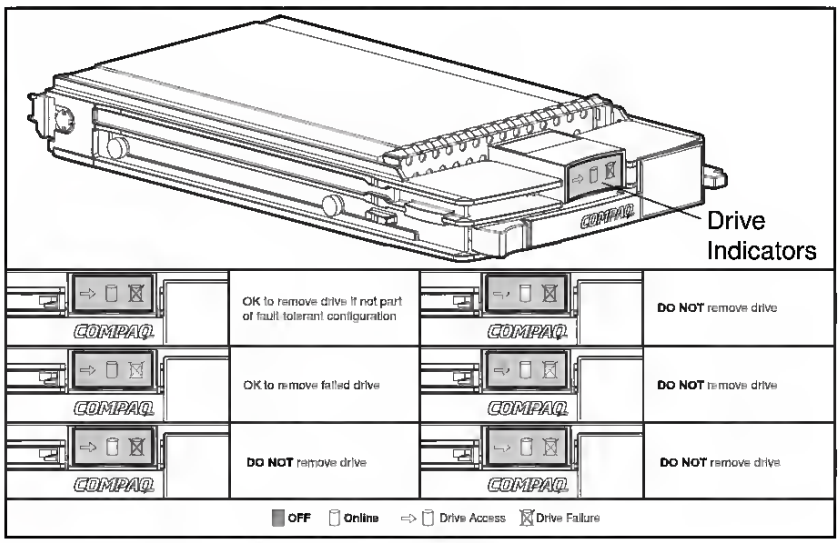

Figure 4-11. Hot-plug hard drive replacement conditions

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Power Supply LED Status Indicators

Each power supply has status and AC power indicators. See Figure 4-12 and Table 4-10 for a detailed description of both indicators.

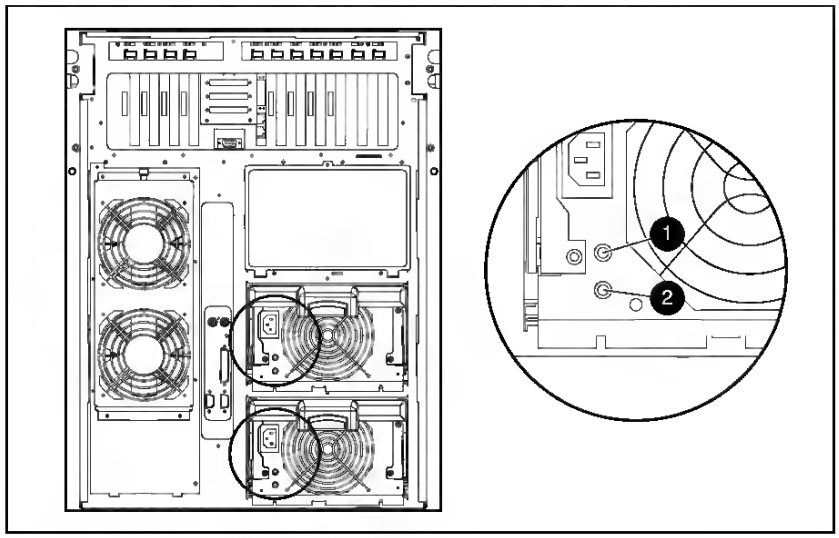

Figure 4-12. Power supply indicators

Table 4-10
Power Supply LED Status Indicators

LED	Indicator (By Symbol)	Condition	Indication
❶	Status	Green	No fault detected in this power supply.
	⚠	Green/Amber alternating	Power supply failed to restart after a prolonged fault.
		Green flashing	Software shutdown
		Amber	Fault detected in this power supply
		Amber flashing	Failed self-test
		Off	System is in standby mode or interlock is disabled.
❷	AC Power	Green	AC power is connected to this power supply.
	☼	Off	No AC power is connected to this power supply.

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CD-ROM/Diskette Drive LED Status Indicators

Figure 4-13 shows the LEDs for the CD-ROM/diskette drive assembly. Table 4-11 sbows the referenced CD-ROM drive conditions.

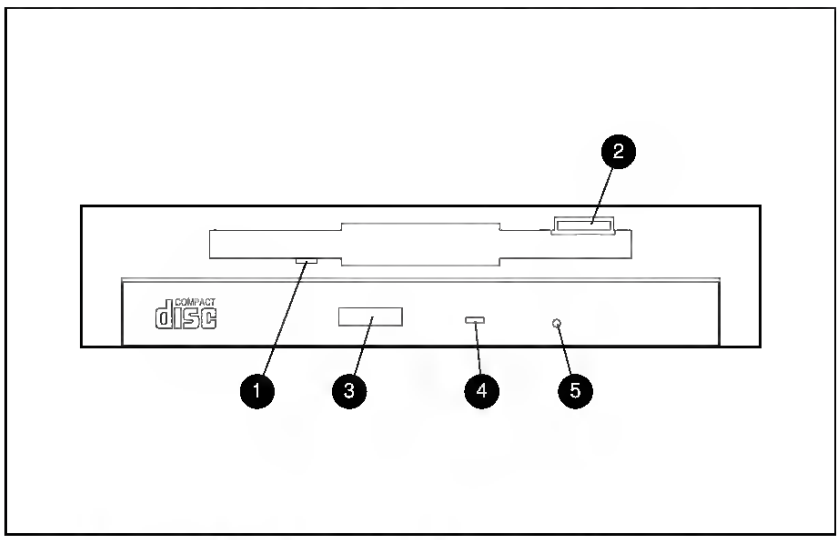

Figure 4-13. CD-ROM/diskette drive LED status indicators and related components

Table 4-11
CD-ROM/Diskette Drive LED Indicators and Related Components

Item	Description
❶	Diskette status LED
❷	Diskette ejector switch
❸	CD-ROM ejector switch
❹	CD-ROM status LED
❺	CD-ROM emergency ejector opening

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Chapter 5

Specifications

This section provides operating and performance specifications for Compaq ProLiant 8000 servers.

- System unit
- Power supply
- Dual Inline Memory Module
- 1.44-MB diskette drive
- IDE Max Slimline CD-ROM Drive
- Hot-plug Ultra2 SCSI hard drives
- Hot-plug Ultra3 SCSI hard drives
- Smart Array 4250ES Controller
- NC3131 Fast Ethernet 64 PCI Dual 10/100 Controller

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System Unit

Table 5-1
System Unit Specifications

Dimensions		
Height	70.8 cm (27.88 inches)	
Width	48.6 cm (19.12 inches)	
Depth	68.3 cm (26.88 inches)	
Weight (no drives and two power supplies)	54.0 kg (119 pounds)	
Temperature range		
Operating	10° to 35°C (50° to 95°F)	
Shipping	-30° to 60°C (-22° to 122°F)	
Relative humidity (noncondensing)		
Operating	20% to 80%	
Nonoperating	5% to 90%	
Maximum wet bulb temperature	38.7°C (101.7°F)	
Input requirements (per power supply)	**High Range**	**Low Range**
Rated input voltage	200 to 240 V	100 to 120 V
Rated input frequency	50 to 60 Hz	50 to 60 Hz
Rated input current	6 A	8 A
Input power	1700 W @ 220 V	780 W @ 110 V
Input power (BTU/hr)	5802 Btu/hr	2662 Btu/hr
Power supply output power (per power supply)	**High Range**	**Low Range**
Rated steady-state power	1150 W	500 W
Maximum peak power	1180 W	549 W

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Power Supply

Table 5-2
Power Supply Specifications

General specifications		
Full output rating	To 40°C and 1,525 meters (104°F and 5,000 feet)	
	To 32°C and 3,050 meters (90°C and 10,000 feet) (derate linearly)	
Minimum load	1.0 A on + 5V output	
	1.0 A on +12V output	
	0.5 A on +3.3 V output	
Ambient temperature range		
Operating	10° to 40°C (50° to 104°F)	
Storage	-40° to 65°C (-40° to 149°F)	
Input specifications	**High Range**	**Low Range**
Nominal line voltage	200 to 240 VAC	100 to 120 VAC
Range input line	180 to 270 VAC	90 to 132 VAC
Frequency range	47 to 63 Hz	47 to 63 Hz
Power factor	0.95	0.95
Input power	1150 W @ 220 V	500 W @ 110 V
Input current	8 A at 200 VAC	8 A at 100 VAC
Inrush current	<150 A at 132 VAC (cold start)	<150 A at 132 VAC (cold start)
Holdup time	20 ms from zero crossing at 240 VAC	20 ms from zero crossing at 120 VAC
Dielectric voltage withstand		
Input to output	3000 VAC/minute	3000 VAC/minute
Input to ground	1500 VAC/minute	1500 VAC/minute
Input transient susceptibility		
Common and differential mode (superimposed on AC line)	2500 V, 1 μs, damped sinusoid 600 V, 10 μs pulse	
Differential mode	20% step change in AC input voltage	

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Dual Inline Memory Module

Table 5-3
DIMM Specifications

Size	128 MB, 256 MB, 512 MB, or 1 GB
Speed	100 MHz
Upgrade requirement	Bank of 2 DIMMs; must be same type, size, speed, and manufacturer
Type	SDRAM DIMMs

Note: Use only 128MB, 256MB, 512MB, or 1GB standard SDRAM DIMMs.

1.44-MB Diskette Drive

Table 5-4
Diskette Drive Specifications

Size	3.5 inches
LED indicators (front panel)	Green
Read/write capacity per diskette (high/low density diskettes)	1.44 MB/720 KB
Drives supported	1
Drive height	11 mm
Drive rotation	300 rpm
Transfer rate (high/low) in Kbs per second	500 K/250
Bytes per sector	512
Sectors per track (high/low)	18/9
Tracks per side (high/low)	80/80
Access time	
Track-to-track (high/low)	3 ms/6 ms
Average (high/low)	174/94 ms
Settling time	15 ms
Latency average	83/100 ms
Cylinders (high/low)	80/80
Read/write heads	2

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IDE Max Slimline CD-ROM Drive

Table 5-5
IDE Max Slimline CD-ROM Drive Specifications

Dimensions	
Height	4.29 cm (1.68 inches)
Width	15.0 cm (5.85 inches)
Depth	20.8 cm (8.11 inches)
Weight	1200 g (2.65 lb)
Operating conditions	
Temperature	5° to 45°C (41° to 113°F)
Humidity	10% to 80%
Applicable disk	CD-ROM (modes 1 and 2) CD-DA, CD-XA (mode one, forms 1 and 2), photo CD (single/multiple-session), mixed mode (audio and data combined)
Capacity	550 MB (mode 1, 12 cm) 640 MB (mode 2, 12 cm)
Block size	2048, 1024 bytes (mode 1) 2340, 2336, 1024 bytes (mode 2) 2352 bytes (CD-DA) 2328 bytes (CD-XA)
Diameter	12 cm (4.7 inches), 8 cm (3.15 inches)
Rotational speed	4200 rpm maximum
Center hole thickness	1.2 mm (0.05 inches)
Track pitch	1.6 µm
Data transfer rate	
Sustained	150 KB/s (single)
Variable	1500 to 3600 KB/s (10X to 24X)
Data transfer method	32-bit bus-master PCI
Access times (typical)	
Full stroke	< 100 ms
Random	< 150 ms
Cache/buffer	128 KB
Startup time (typical)	< 7 s
Stop time	< 4 s

Note: Data transfer rates will vary from 150 KB/s to 3,600 KB/s to 4,800 KB/s depending on CD-ROM speed.

continued

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Table 5-5
IDE Max Slimline CD-ROM Drive Specifications *continued*

Line out	0.7 VRMS at 47 kOhms
Headphone	0.6 VRMS at 32 Ohms (maximum volume)
Laser parameters	
Type	Semiconductor Laser GaA1As
Wavelength	780 +/- 25 nm
Divergence angle	53.5° +/- 1.5°
Output power	0.14 mW
Interface	IDE (ATAPI)

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Hot-Plug Wide Ultra2 SCSI Hard Drives

Table 5-6
Hot-Plug Wide Ultra2 SCSI Hard Drives

	4.3-GB	4.3-GB (10K)	9.1-GB	9.1-GB (10K)	18.2-GB
Capacity	4293.6 MB	4293.6 MB	9100.0 MB	9100.0 MB	18209.8 MB
Height	1.0 inches	1.0 inches	1.0 inches	1.0 inches	1.0 inches
Size	3.5 inches	3.5 inches	3.5 inches	3.5 inches	3.5 inches
Interface	Wide-Ultra2 SCSI	Wide-Ultra2 SCSI	Wide-Ultra2 SCSI	Wide-Ultra2 SCSI	Wide-Ultra2 SCSI
Transfer rate	80 MB/s	80 MB/s	80 MB/s	80 MB/s	80 MB/s
Seek time (typical, including setting)					
Single track	0.8 ms	0.8 ms	0.8 ms	0.8 ms	0.8 ms
Average	8.8 ms	5.4 ms	7.9 ms	5.4 ms	6.9 ms
Full stroke	17.0 ms	12.2 ms	17.0 ms	12.2 ms	15.0 ms
Rotational speed	7,200 rpm	10,000 rpm	7,200 rpm	10,000 rpm	7,200 rpm
Physical configuration					
Bytes/Sector	512	512	512	512	512
Logical blocks	8,386,000	8,389,000	17,773,500	17,773,500	35,566,000
Operating temperature	50° to 95°F 10° to 35°C	50° to 86°F 10° to 30°C	50° to 95°F 10° to 35°C	50° to 86°F 10° to 30°C	50° to 95°F 10° to 35°C

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Hot-Plug Wide Ultra3 SCSI Hard Drives

Table 5-7
Hot-Plug Wide Ultra3 SCSI Hard Drives

	9.1-GB	18.2-GB
Capacity	9100.0 MB	18209.3 MB
Height	1.0 inches	1.0 inches
Size	3.5 inches	3.5 inches
Interface	Wide-Ultra3 SCSI	Wide-Ultra3 SCSI
Transfer rate	160 MB/s	160 MB/s
Seek time (typical, including setting)		
Single track	0.8 ms	0.8 ms
Average	5.0 ms	5.2 ms
Full stroke	12.0 ms	12.0 ms
Rotational speed	10,000 rpm	10,000 rpm
Physical configuration		
Bytes/Sector	512	512
Logical blocks	17,773,524	35,565,080
Operating temperature	50° to 95°F 10° to 35°C	50° to 95°F 10° to 35°C

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Smart Array 4250ES Controller

Table 5-8
Smart Array 4250ES Controller Specifications

Protocol	Wide Ultra2 SCSI
Dimensions	
Height	13.7 cm (5.4 inches)
Length	31.5 cm (12.4 inches)
Thickness (including array accelerator)	2.5 cm (1.0 inches)
Temperature range	
Operating	10° to 35°C (50° to 95°F)
Shipping	-30° to 60°C (-22° to 140°F)
Relative humidity (non-condensing)	
Operating	20% to 80%
Nonoperating	5% to 90%
Heat dissipated (maximum)	16.7 W
Cache battery backup	Standard
Software upgradable firmware	Yes
Maximum drives supported	Up to 21 internal
Logical drives supported	32
Simultaneous drive transfer channels	Three (optimized for 21 drives)
Data transfer method	64-bit PCI bus master
Total transfer rate	240 MB/s
SCSI electric interface	Low-voltage differential
PCI bus transfer rate (maximum)	266 MB/s
SCSI port connectors (internal and external)	3 internal cable-free SCSI ports/0 external
Cache	64-MB battery-backed and removable

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NC3131 Fast Ethernet NIC 64 PCI Dual 10/100 Controller

Table 5-9
NC3131 Fast Ethernet NIC 64 PCI Dual 10/100 Controller

Network interface	10Base-T/100Base-TX
Compatibility	IEEE 802.3/802 3u compliant
Data transfer method	32/64-bit bus-master PCI
Network transfer rate	
10Base-T (half-duplex), 10Base-2	10 Mb/s
10Base-T (full-duplex)	20 Mb/s
100Base-TX (half-duplex)	100 Mb/s
100Base-TX (full-duplex)	200 Mb/s
Connector	2 RJ-45
Power required	1050mA @ 5 volts maximum
I/O address and interrupt	Automatic configuration
Cable support	
10Base-T	Categories 3, 4, or 5 UTP (2 or 4 pair), up to 100 meters (328 feet)
100Base-TX	Category 5 UTP (2 pair), up to 100 meters (328 feet)
Operating system driver support	Novell NetWare Server 5.x, IBM LAN Server NDIS 3.0 Microsoft Windows 2000, Microsoft Windows NT, Microsoft Windows 95, Microsoft Windows for Workgroups SCO UNIX

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